American
Gas Journal
THE MAGAZINE OF GAS DISTRIBUTION

FEBRUARY 1960

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"This does not mean we have reached the saturation point in sales. On the other hand, it does mean we must exert ever greater effort to maintain our rate of growth.

"An area for immediate action is research. It is plain that we must pour forth a continuous stream of new, more economical and attractive products that utilize gas if we are to capture and hold the imagination of the public with the modern appeal and superiority of our fuel. Consumers will respond dramatically if we continue to offer something new and better."

WISTER H. LIGON, *President*
American Gas Association

Normally our advertisement appears in this space. We are happy to forego this issue in the interests of an important message to the industry. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

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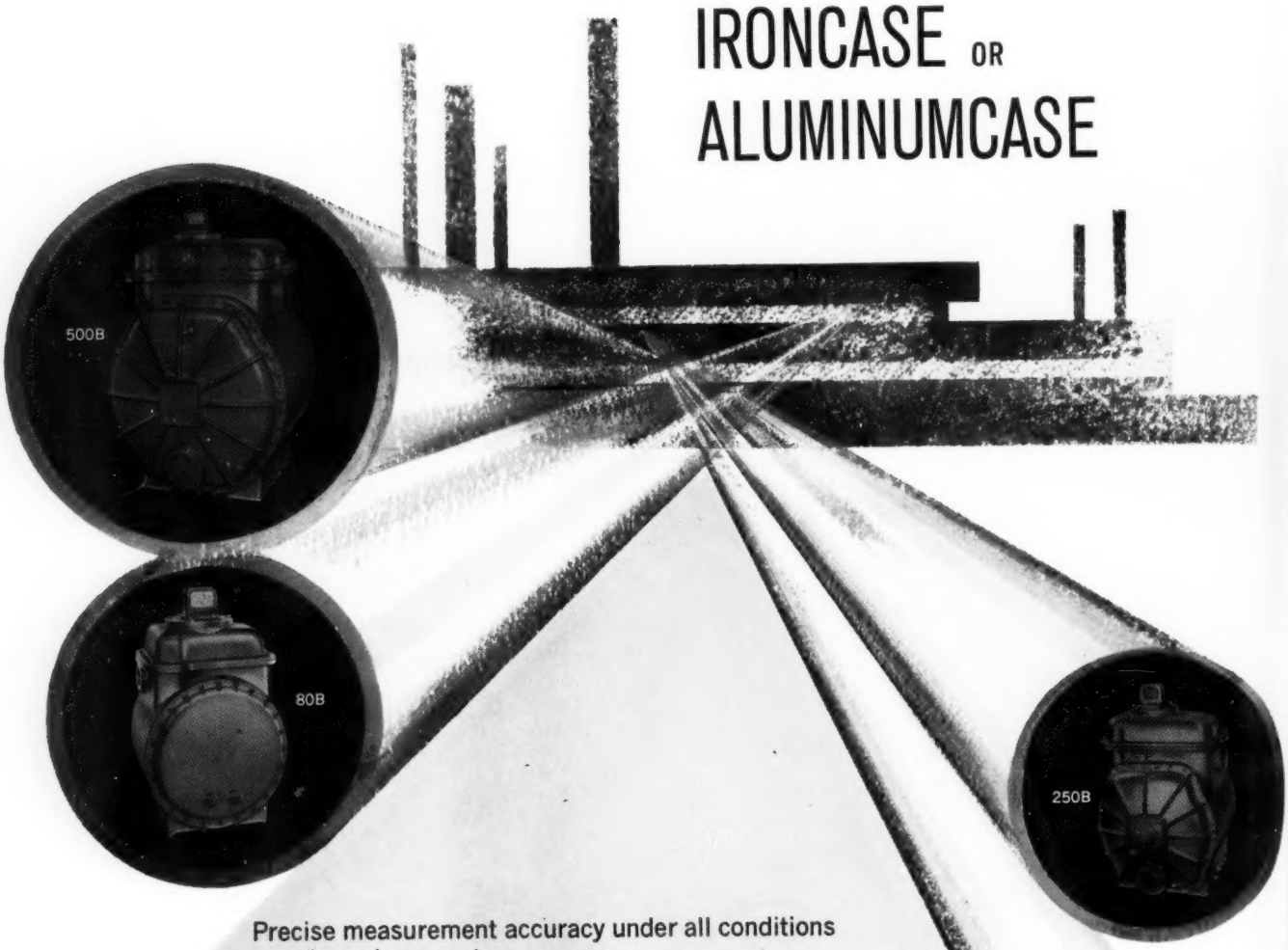

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..LIGHTS

Digits, Dials & Dispatching

The three men in the photograph above are examining one of the newest developments in the gas distribution industry — a development that will have a profound effect on gas dispatching operations and one that may be a forerunner of far-reaching applications of automation to distribution operations. The scene is the gas dispatching center of Public Service Company of Colorado in Denver. The men, left to right, are Will G. Neahr, PSCo gas dispatching engineer, operating the Flexowriter; Raymond R. Silkensen, gas measurement engineer and chief dispatcher (center), and Willard J. Karcher, Jr., dispatching engineer. In the right foreground, playing a starring role, is a new Libratrol-500 computer, which is going to make the daily task of the three men much easier. Dispatchers at PSCo used to make hourly flow calculations after reading all those dials in the background; now they get flow calculations every six minutes, thanks to the electronic genius of the computer. For more details, turn to page 21.

Next Month

AGJ's editors report on some unusual — even startling — developments in corrosion mitigation ideas, methods, materials, and equipment. Also on the agenda are reports about competitive heating (electric, if you must know), a successful direct mail program to sell gas air-conditioning, and new ideas in construction methods.

American Gas Journal

ONLY MAGAZINE EDITED EXCLUSIVELY FOR THE GAS DISTRIBUTION INDUSTRY

Volume 187 February 1960 Number 2

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COOKING IN THE FIREPLACE was romantic but hardly efficient. Heat was slow, uneven, uncontrollable . . . iron pots and pans, heavy. Feeding the family was work!

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GAS "BURNERS WITH BRAINS" in today's kitchen . . . most recent achievement of the gas industry . . . "feel" and control heat in pots and pans . . . make cooking automatic . . . a pleasure!

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M C F

NEWS HILITES OF THE INDUSTRY

Mergers — actual and proposed — highlight recent industry developments. Arkansas Louisiana Gas Company and **Consolidated Gas Utilities Corporation** boards of directors have approved in principle a proposed merger of the latter utility into Arkansas Louisiana Gas Company. The merger is subject to approval of stockholders in both firms and by regulatory agencies having jurisdiction. Consolidated serves some 90,000 customers in Oklahoma and Kansas; Arkansas Louisiana serves approximately 280,000 in Arkansas, north Louisiana, and east Texas. **In Delaware,** the state public service commission has approved merger of three gas companies serving lower Delaware and Salisbury in Maryland. The three — **Dover Gas Light Company, Citizens Gas Company,** and **Sussex Gas Company** — are all subsidiaries of Chesapeake Utilities Corporation, a holding company. **Council Bluffs Gas Company,** Council Bluffs, Iowa, has been merged into **Northern Natural Gas Company** by a stock exchange transaction. The property will be known as the Council Bluffs division of Northern Natural. **Oklahoma Natural Gas Company** of Tulsa, and **Northern Oklahoma Gas Company,** Ponca City, have also announced plans for a merger. Northern Oklahoma serves residential, commercial, and industrial customers in several cities in an area of north central Oklahoma and has approximately 14,000 customers. Oklahoma Natural serves 153 cities and towns and adjoining areas of the state and has approximately 370,000 customers. **Merger of Pacific Northwest Pipeline Corporation and El Paso Natural Gas Company** has been approved by the FPC, leaving only one obstacle remaining to be cleared — disposition of an anti-merger suit by the government. Action on the suit, filed by the department of justice, has been delayed in a Utah Federal District Court pending the FPC decision.

Favored nation clauses in independent producer contracts — and how the FPC will treat them in the future — are up for diagnosis and possible surgery. Hearings set for January 28 in Washington will revolve around two important issues — are favored nation clauses void or voidable as contrary to the public interest and what triggers action on such a clause? Both items are expected to get much argument on the Pure Oil Company's rate case (G-17,930) in which Pure says that a 16¢ per Mcf rate for 50,000,000 cu ft per day Permian Basin gas sold by West Texas Natural Gas Gathering Company to El Paso Natural Gas Company served to trigger a favored nation clause in Pure's contract with El Paso for Permian Basin reserves. An FPC examiner in November said no triggering occurred and recommended that Pure's rate filing of $99,000 per year be dismissed. The oral arguments are seen as an FPC move to take a hard look at the theory and practice of favored nation clauses . . . and feeling is that they are on the way out.

"Hi-Load Commercial Gas Water Heating Campaign" sponsored by the Industrial and Commercial Gas Section of A.G.A. will begin on March 1 this year and continue through May 30. In previous years, the annual campaign began in February; postponement of the inaugural date for one month was made because of generally unfavorable weather conditions occurring during February in most parts of the nation and the fact that most customers aren't inclined to change their equipment while the winter heating season is still in effect. New dates are expected to add impetus to the program and aid sales promotional activities.

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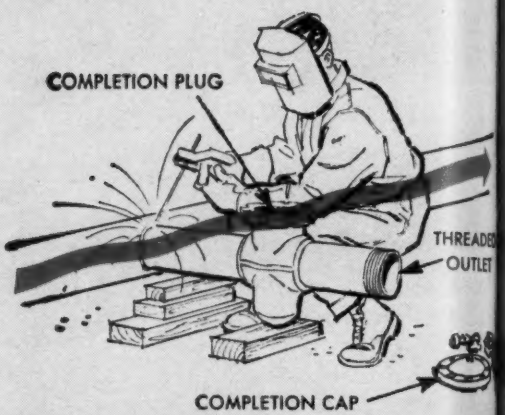
hot taps without

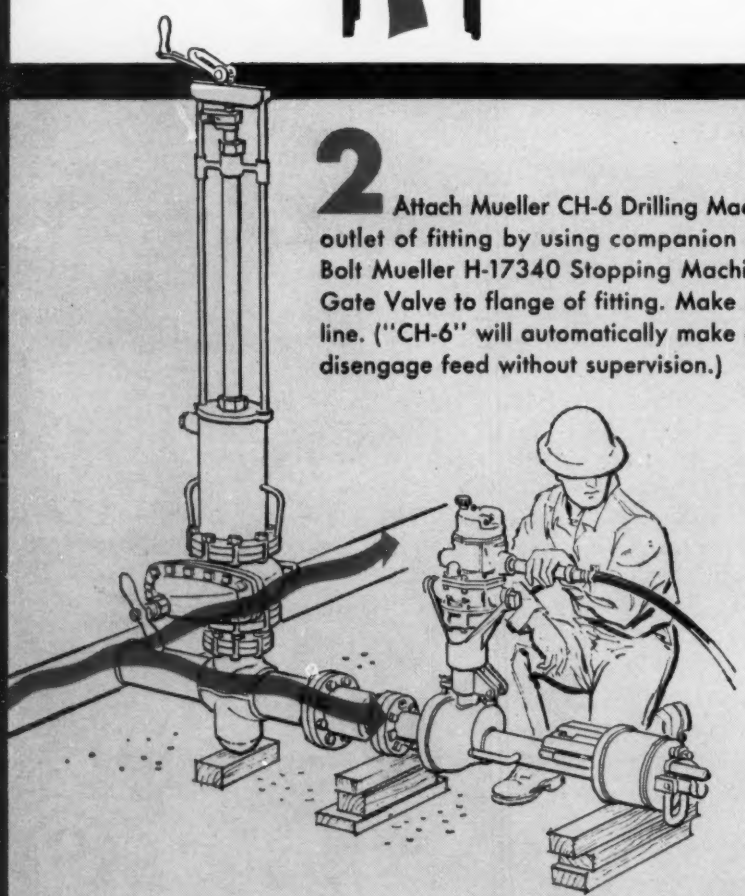
PROBLEM:

Tie in a new, permanent 6" line to present operating system without interrupting flow. Provide means of valving in new line without installing permanent valves.

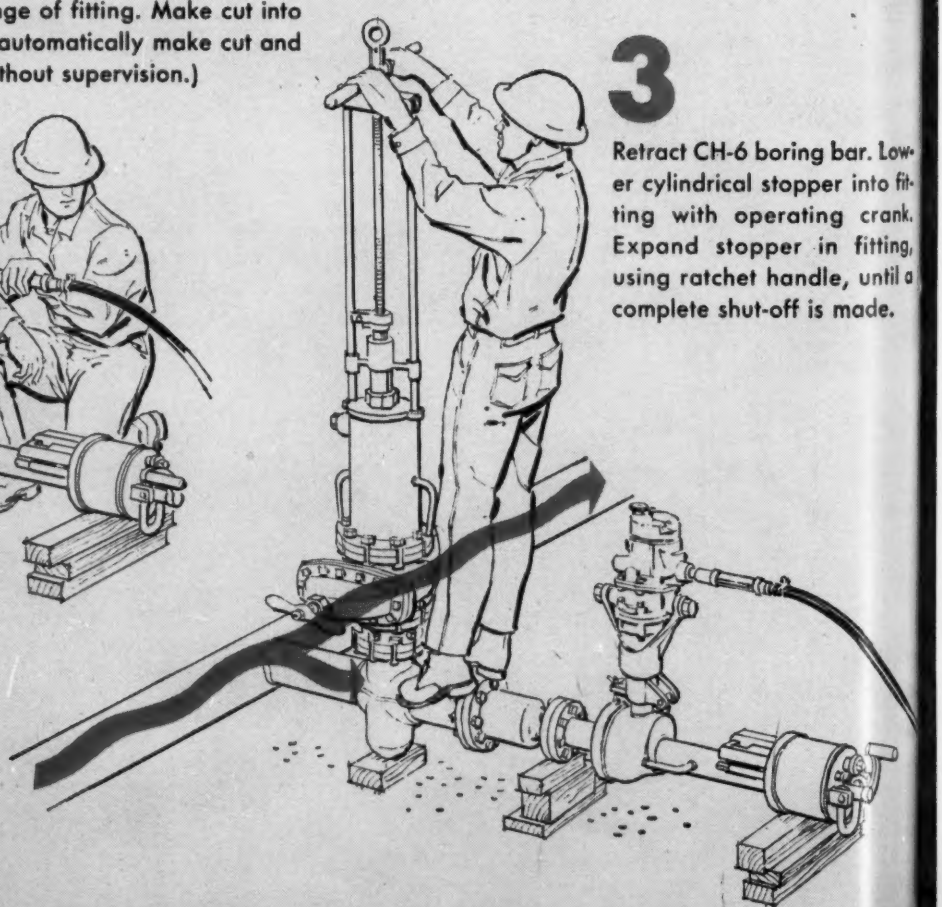
HERE'S HOW



1 Weld exclusive Mueller Extension Stopper Fitting to operating line. (6" fitting shown. Other sizes from ¾" to 8" available.)



2 Attach Mueller CH-6 Drilling Machine to outlet of fitting by using companion flange. Bolt Mueller H-17340 Stopping Machine and Gate Valve to flange of fitting. Make cut into line. ("CH-6" will automatically make cut and disengage feed without supervision.)



3 Retract CH-6 boring bar. Lower cylindrical stopper into fitting with operating crank. Expand stopper in fitting, using ratchet handle, until a complete shut-off is made.

valves!

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on applications of

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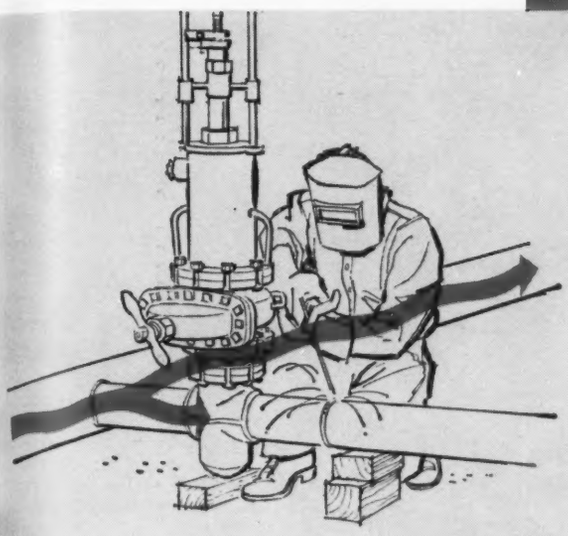
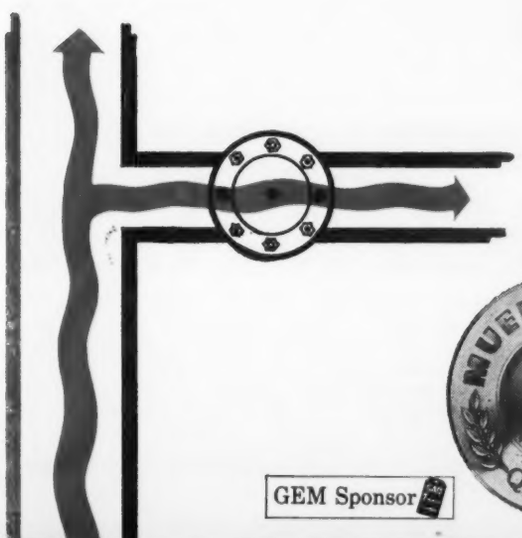


4 Remove CH-6 Machine. Attach new line to fitting and extend to next valve. (Companion flange may be used to connect line or threads may be cut off for welding connection.)

5 Equalize pressure in new line. Contract and raise stopper. Close valve and remove stopping machine. (New piping is now under full pressure.) Bolt Mueller H-17346 Completion Machine to gate valve, open valve and screw completion plug into top of fitting. Remove machine and gate valve and bolt completion cap to flange of fitting.

SOLUTION:

Line has been safely tied in under full system pressure without shutdown or other disturbance to operating facility. Only maintenance-free fitting remains in new line—no valve! Stopping machine may be re-mounted on fitting and line stopped-off whenever needed.



These fittings and machines are just a small part of Mueller's complete system of No-Blo products—products especially designed for use with fluid facilities under pressure.

No-Blo products and methods make it possible to extend dead ends, to transfer service to another line, to isolate a section of line, to repair leaks, to make tie-ins, to run laterals, to install or replace equipment—all under full operating pressure in a safe, controllable manner and without shutdown!

The No-Blo System is typical of the constant attention to detail—and more than a century of experience—in research, design and engineering that is a part of all Mueller fittings and equipment.

Mueller also manufactures a full line of components for water distribution systems, fire protection systems and plumbing systems.

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NEWSREEL

A. D. Barney, chairman of the board of Hartford Electric Light Co., has been elected president of the Connecticut Electric and Gas Association, succeeding N. B. Bertolette, chairman of the board of the Hartford Gas Co. Other newly elected officers include: *Vice presidents,* R. A. Gibson, president, Hartford Electric Light Co., and H. R. Bacon, president, Housatonic Public Service Co.; *secretary and treasurer,* R. F. Probst, vice president and secretary of Connecticut Light & Power Co.; and *assistant secretary-treasurer,* C. J. Ramage, assistant secretary and treasurer, Connecticut Light & Power Co. Elected to the executive committee were chairman, S. R. Knapp, president, Connecticut Light & Power Co.; A. D. Barney, William J. Cooper, president, United Illuminating Co.; W. T. Jebb, president, Hartford Gas Co., E. G. Rhodes, president, New Britain Gas Co., and R. A. Malony, president, Bridgeport Gas Co.

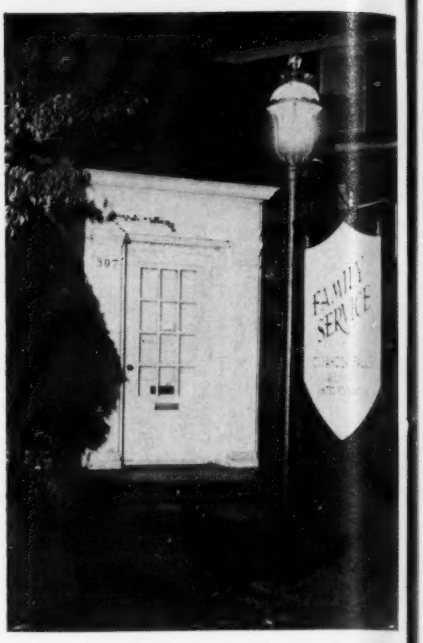
Cooper-Bessemer Corporation has announced a major expansion program in Canada. Through its wholly-owned subsidiary, Cooper-Bessemer of Canada, Ltd., C-B will begin manufacturing operations in a plant leased from the Canadian National Railways at Stratford, Ontario. For several years Cooper-Bessemer has considered the feasibility of manufacturing its products in Canada. Since 1949, C-B of Canada, Ltd. has served as a marketing organization with warehouse and service facilities. Plans call for immediate use of some 60,000 sq ft of the 200,000 sq ft facility. Employment will start at less than 100 people, may eventually reach 500. Establishment of the Stratford plant brings to five the number of C-B manufacturing plants.

Bernard Kaapcke, special feature editor on the American Gas Association's public information staff for the past three years, has been named editor of the A.G.A. Monthly succeeding Walter H. Dyer, who resigned January 1 to join the public relations staff of D'Arcy Advertising Co. of New York City.

Hupp Corp., has acquired the assets of John J. Fannon Products Co. and John J. Fannon & Co., Detroit, pioneers in industrial process heating equipment and developers of paint baking ovens used in the auto industry. Total amount of the transaction was not disclosed. Don H. Gearheart, Hupp president, noted that the "Fannon activities will help Hupp broaden its coverage in industrial infrared heating and complement Hupp's own activities in this field." Hupp's Perfection Division has pioneered the use of gas infra-red heaters based on inventions of German scientist Gunther Schwank. The Fannon companies have extensive experience with infra-red quartz electric heat applications and with gas heating equipment employing Perfection-Schwank burners. The acquisitions will be operated as a wholly-owned subsidiary of Hupp Corporation, with John J. Fannon, Jr., as president, and Robert J. Fannon, vice president. Headquarters for the new subsidiary will remain in Detroit.

Texas Illinois Natural Gas Pipeline Co. has transferred its assets to Peoples Gulf Coast Natural Gas Pipeline Co. completing a plan of reorganization announced last September. The transfer was announced by Eskil I. Bjork, chairman of The Peoples Gas Light and Coke Co., of which both pipeline companies are subsidiaries. Under the plan, common stockholders of Texas Illinois will receive one share of Peoples Gas capital stock for each two shares of Texas Illinois common stock. Texas Illinois is to be liquidated.

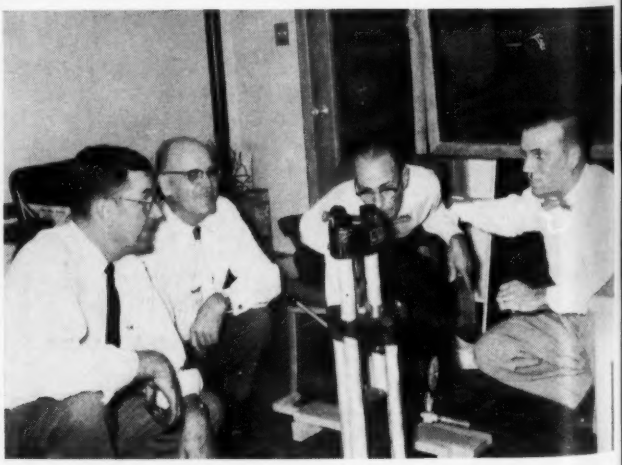
Hazards and control of static electricity on and off the job are dramatically demonstrated in a new 16 mm color sound motion picture produced by American Gas Association's Accident Prevention Committee in cooperation with the U. S. Bureau of Mines. The 22-minute color movie, entitled, "Static Electricity," shows the destructive power of static and how it can be controlled in home and industry. Copies of the film may be purchased for $200 plus shipping charges from A. G. A.



Gas Light helps convey welfare agency's symbol of eternal flame. A white-domed gas light, patterned after the original gas lights used on American streets, illuminates the Family Service office, a United Foundation Agency, at Cuyahoga Falls, Ohio. The light, says E. J. Burke, supervisor of sales for The East Ohio Gas Co., and a member of the board of directors of the Family Service, is especially appropriate for the office since the welfare agency's symbol is an eternal flame.

Consolidation of Humphrey gas heaters into the production of its expanding line of gas equipment has been achieved by Arkla Air Conditioning Corporation, and design work is near completion on the 1960 Humphrey heater line. Arkla, wholly owned subsidiary of Arkansas Louisiana Gas Co., purchased the Humphrey heater business from General Gas Light Co., of Kalamazoo, Michigan, last spring. Production facilities were moved from Kalamazoo to Arkla's Evansville, Indiana, plant where they were dovetailed with the manufacture of Arkla-Servel Sun Valley gas air conditioners, gas lights, gas signs, and other products.

New York State Electric & Gas Corp., Binghamton, New York, recently added its 100,000 gas customer--the Max R. LeFever residence in Homer, New York. Marking the milestone, John R. Mohler (right), local manager at Cortland, presented the LeFever family with a top 4-burner gas cooking unit, including a thermostatically controlled burner, and a combination built-in gas oven and broiler.



Machine used to test the efficiency of pipe welds is demonstrated during the opening session of Southern Union Gas Company's new training program. Left to right are: Roy Wiegand, staff assistant for construction and maintenance activities; Porter Martin; John Kaper, construction and maintenance superintendent, Port Arthur, Texas; and M. Y. Hibler, general superintendent, Galveston, Texas.

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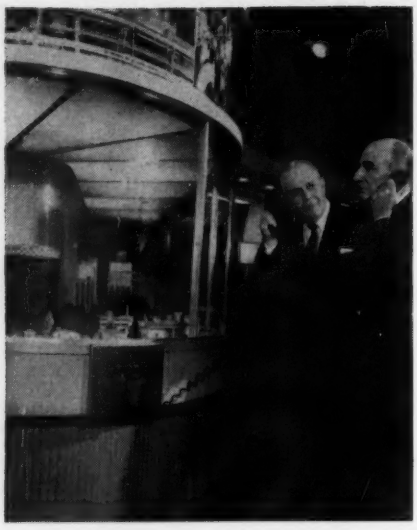


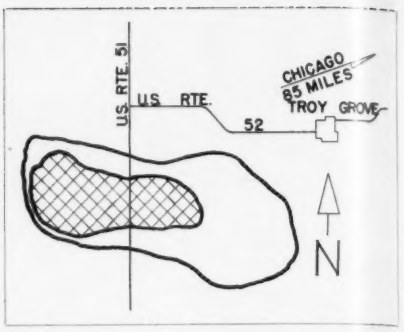
The "Story of Flame Gas" exhibit at the Museum of Science and Industry, Chicago, which has been seen by hundreds of thousands of people since its installation in 1950, has been redone to reflect gas industry achievements and new uses of gas developed in the past 10 years. New feature of the main display is a gas production model which shows how gas comes from the well to the consumer. The display uses push-button animation which permits the viewer to activate the exhibits as he watches. Here chairman Eskil I. Bjork (left) of The Peoples Gas Light and Coke Company, is shown with Major Lenox Lohr, president of the Museum, as Lohr listens to the tape recording that tells the story of how gas is brought to the Chicago consumers.

Walworth Company has renamed one of its traditional lines of valves—"Rolotork" is now used to designate its high pressure, steel, ball-bearing lubricated plug valve. Main reason for the change, Walworth explains, is to identify the valve without giving a detailed description of it, thereby making it easier to be specified. The newly-named valves which have been produced by Walworth for the last quarter-century range from ½ to 30-in., are made of carbon or alloy steel, and are capable of withstanding pressures up to 5000 psi.

E. H. Tollefson, president of Consolidated Natural Gas Co., has been re-elected chairman of the board of trustees of the Institute of Gas Technology. Three new trustees were elected and seven trustees renamed. Elected to fill vacancies on the board were **Ed Parkes,** president, United Gas Corp.; and **R. F. Brooker,** president, Whirlpool Corp., both for three-year terms; **Karl E. Schmidt,** vice president, Michigan Consolidated Gas Co., for a 2-year term. Trustees re-elected for 3-year terms were: **Milton J. Pfeiffer,** vice president, Cincinnati Gas & Electric Co.; **Linn Bowman,** vice president, Rochester Gas and Electric Corp.; **R. M. Heskett,** chairman, Montana-Dakota Utilities Co.; **Gerald T. Mullin,** president, Minneapolis Gas Co.; **R. A. Puryear, Jr.,** president, Alabama Gas Corp.; **Frank C. Smith,** chairman of the board, Houston Natural Gas Corp., and **F. S. Cornell,** executive vice president, A. O. Smith Corp.

ANNUAL REPORT OSCARS — Awards for the best corporate annual reports of the year as selected in the 19th annual report survey conducted by "Financial World," national weekly financial magazine, were presented to the nation's leading corporations at a banquet in New York October 26. Lone Star Gas Company and Northwest Natural Gas Company took first place, in their respective categories — Gas products, assets $75,000,000 and up, and assets under $75,000,000. Annual reports of National Fuel Gas Company and of Indiana Gas & Water Company placed second; and those of Consolidated Natural Gas Company and of Washington Natural Gas Company placed third.

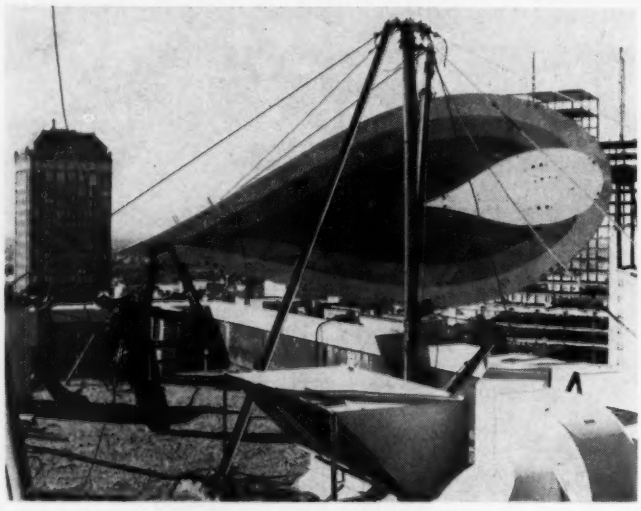
Dick Chinn, manager of market research, Massey-Ferguson Industrial Division, Wichita, Kansas, has been elected to the presidency of the newly organized Industrial Equipment Manufacturers' Council. Elected vice president was John Scowcroft, assistant to the president, Sherman Products Corp., and Jim Wormley, sales manager, Industrial Division, Deere & Co., has been elected treasurer. Organized to encourage uniform specifications in the light industrial equipment field, the council is drawing wide participation from both major and minor manufacturers.



Map shows outline of Northern Illinois Gas Co.'s underground storage reservoir near Troy Grove (between LaSalle and Mendota). The porous sandstone structure is about 1500 ft below surface. The Illinois Commerce Commission has approved NI-Gas' petition to operate the shaded area, about 500 acres, beginning in the 1960-61 winter. The ICC also okayed development and testing of the bigger white area, an approximate additional 1000 acres.

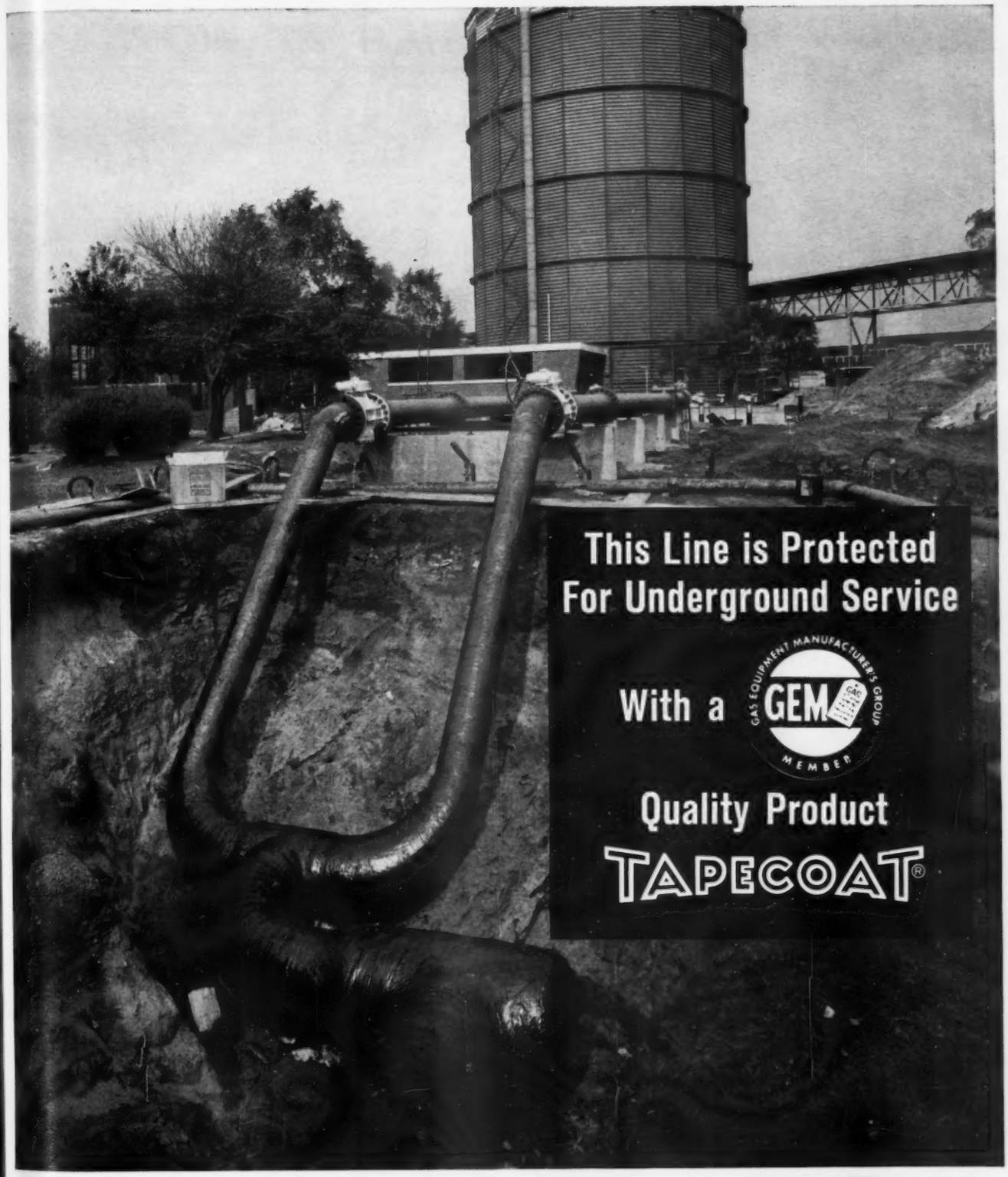
Inland Natural Gas Co. Ltd., in its first 1960 quarterly report to shareholders, announced it has taken preliminary steps to extend natural gas service to the East Kootenay. Inland, which currently provides natural gas utilities for Cariboo, Okanagan, and West Kootenays, and has subsidiary gas producing and transmission companies in northern British Columbia and Alberta, has conducted market surveys in the East Kootenay area and has secured a letter of intent from Westcoast for a supply of gas when the projected pipeline from Coleman, Alberta, to the U. S. border at Kingsgate, B. C. (sponsored by Westcoast Transmission and a subsidiary of Pacific Gas and Electric) has been built.

Plicoflex's modern polyvinyl chloride compounding and calendering plant in Houston recently went into production. Plant is currently being used for production of corrosion resistant pipeline wrapping tape, made of polyvinyl chloride and butyl rubber, but future plans call for production of a wide variety of plastic goods, ranging from soft, flexible "fabrics" to rigid board.



Lone Star Gas Company has installed a huge revolving flame, 20 ft tall and 8 ft wide, largest company trademark on Lone Star's system, atop their Fort Worth offices. The Texas-size flame is done in four-color porcelain enamel and uses three-color lumenarc tubing on the two faces to illuminate the flame. The trademark flame will revolve continuously and a time clock will control the lighting.

"President's Award for the Saving of Human Life" was presented recently by Northern Illinois Gas Co. to two of its employees. Clarence O. Petijean (second from left), and Walter E. Adamic, second from right, are shown here being congratulated by George W. Ryerson, left, secretary and director of public relations for the utility, and NI-Gas president Marvin Chandler, right. Petijean, foreman for the utility, gave artificial respiration May 24 to Otto Bulman, Berkeley, who had stopped breathing apparently because of a heart attack. Adamic, service representative for NI-Gas, used mouth-to-mouth resuscitation to revive 15-month-old Deborah Rugs, daughter of Mr. and Mrs. Gerald A. Rugs, Hampton Park, Romeoville. The baby had stopped breathing, due to a mucous plug.



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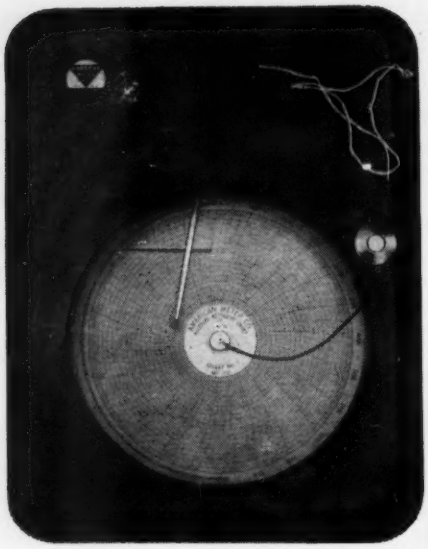

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MEN AT WORK

IN THE GAS DISTRIBUTION INDUSTRY

● **Mrs. Ellen Bridges,** home service director for The Gas Service Co. at Pittsburg, Kansas, since 1944, has been named home service counselor for the American Gas Association succeeding **Miss Jessie McQueen,** who has retired after 30 years as head of A.G.A.'s home service activities.

● **Erwin O. Rossbach,** formerly assistant to the chief chemist, has been promoted to assistant chief chemical engineer of the Brooklyn Union Gas Co.

P. W. Barchard

E. H. Rohrer

● **Philip W. Barchard** has been appointed general manager of British Columbia Electric's gas division succeeding **E. H. Rohrer,** who is retiring after 15 years as head of B. C.'s gas operations. Barchard has been assistant general manager of the gas division since 1957.

● Recent personnel changes at Lone Star Gas Company include: Appointment of **Hoyt E. Wilkinson** as regional accountant for the South Texas region of distribution succeeding **John O. Anselin,** who has been named manager of customer accounting for Lone Star in Dallas. Anselin succeeds **W. R. Stephens,** who retired in October after 33 years of service. **Roland Frazier** has been named chief clerk of Lone Star's Bryan commercial office succeeding **Bob Croxdale,** who recently retired under the disability provision of the company's retirement plan.

● **DeWitt C. MacKenzie** has been named director of purchasing for The East Ohio Gas Co. A graduate of the U. S. Naval Academy, MacKenzie recently retired with the rank of rear admiral after 26 years active duty with the Navy.

D. C. MacKenzie

L. V. Reed

● **Lowell V. Reed,** customer service manager for Manufacturers Light & Heat Co., has been named director of the Columbia Gas System's new customer service training center. Reed has been conducting a service training program at Washington, Pa., for Manufacturers and will now standardize training of all Columbia service personnel who come in contact with customers. Facilities at Washington will be used temporarily and subsequently a new headquarters site for the system training center will be selected.

● **James F. Laird** has been appointed training director for the Pittsburgh Group companies, Columbia Gas System, succeeding **James W. Johnson.**

● Michigan Consolidated Gas Company has announced several personnel changes in its sales department: **Ira J. Rapson** has been named manager of marketing research. **Wilbur H. Glines** succeeds Rapson as Detroit district sales manager and will be in charge of all space heating sales, home service division, advertising and sales promotion. **Milton W. Elert,** formerly superintendent of dealer sales promotion, has been named assistant district sales manager. **Andrew J. Van Hoef** has been named industrial engineer succeeding **C. B. Kiehle,** who recently retired; **George E. Marble** has been appointed assistant industrial engineer; **H. Jerome Seitz** has been appointed superintendent of sales training and promotion; **Donald J. Galloway** has been named dealer coordinator superintendent and **Frederick B. Rucci** has been appointed

W. J. Marion

R. G. Grice

sales crew supervisor. **William J. Marion** is returning to Detroit from Mt. Pleasant to become manager of industrial and commercial sales. He will be in charge of the firm's industrial, commercial, and air conditioning divisions. **Robert G. Grice** of Grand Rapids succeeds Marion as sales manager of the company's northern districts with headquarters in Mt. Pleasant. **William E. Green** has been appointed sales superintendent of Detroit district's commercial division.

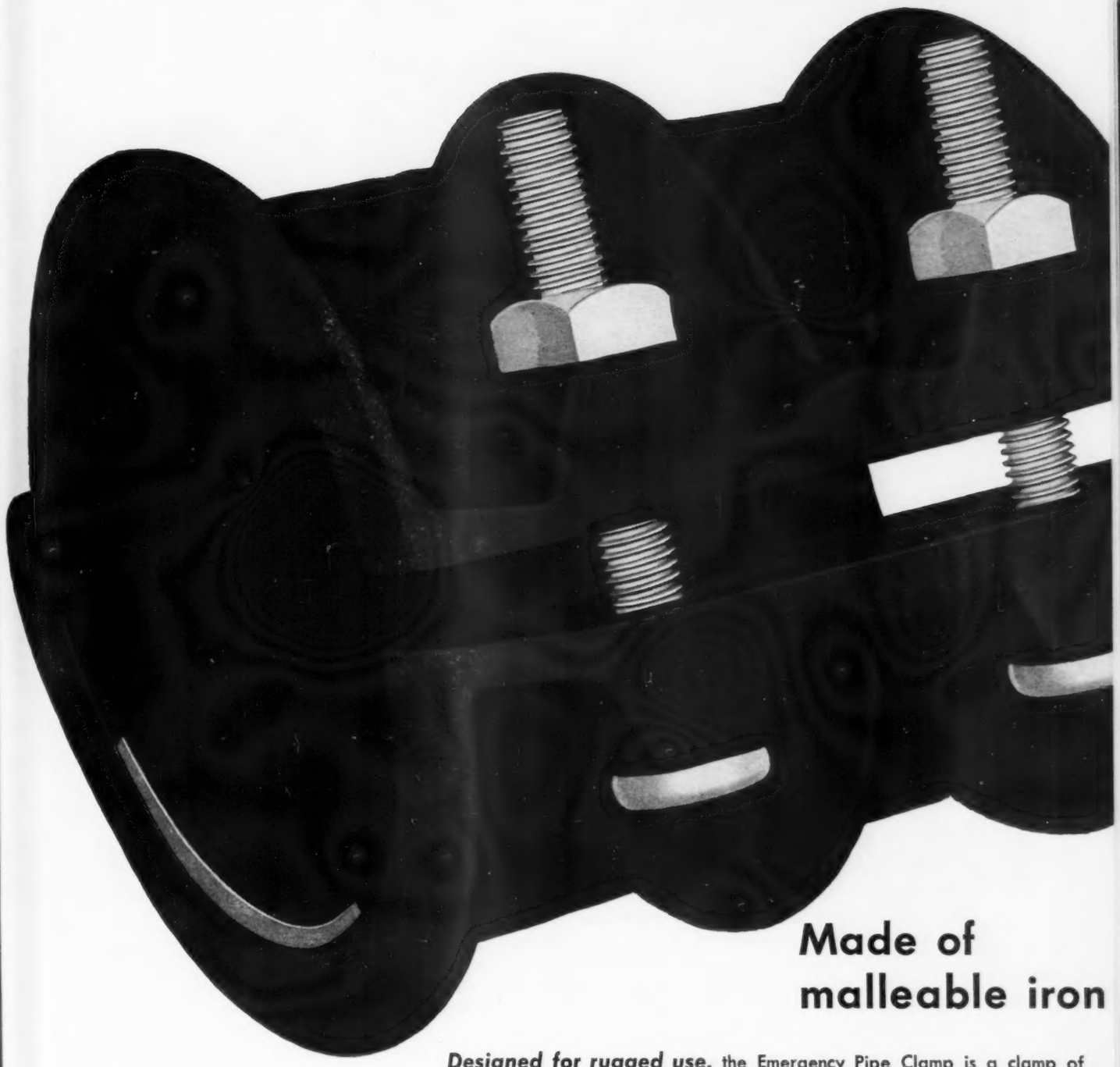
● Lawrence Gas Company has elected **Robert E. Maguire** vice president and manager succeeding **George W. Culver** who retired recently. The new 31-year-old vice president is one of the youngest utility executives in New England. **Armando O. Guarino** has been promoted to general superintendent succeeding Maguire.

● **James D. Little,** rate accounting supervisor for Ohio Fuel Gas Co., has been promoted to the rate department of Columbia Gas System Service Corp. in New York. **Robert S. Allen** has been promoted to general distribution office operations specialist with Ohio Fuel in Columbus.

● **Russell C. Taylor** has been elected president of ACF Industries, Inc. **James F. Clark,** president of the company since 1954, has been elected chairman of the executive committee. Taylor is taking early retirement at the age of 55 from the American Can Company as an executive department vice president and director.

● A. M. Byers Company has appointed three new distributors for its 4-D wrought iron pipe—Standard Supply Co., Greenville, S. C.; Gulf Coast Marine Supply Co., Mobile, Ala.; and I. Bahcall, Inc., Appleton, Wisc.

PIPE REPAIR PERMANENCE



Made of malleable iron

Designed for rugged use, the Emergency Pipe Clamp is a clamp of almost unlimited strength. You might say it looks fairly simple. Yet fifty years of experience have gone into its design . . . the heavy ribbing to "take" the bolt-pull, the skillful shaping of the bolt lugs for terrific strength and a free wrench swing. The full length, massive hinge which no strain can loosen! The over-thickness of metal throughout to make child's play of any pressure! The glove-like fit . . . result of shaping each clamp over an accurate mandrel, pulling it down with a 12,000 pound air vice and sledging to complete snugness.

When you put on the Emergency Pipe Clamp, it is there to stay. Tens of thousands of them are still in place after 20, 30, 40 years' service. Made in C.I. and steel pipe sizes—½" to 12" inclusive.

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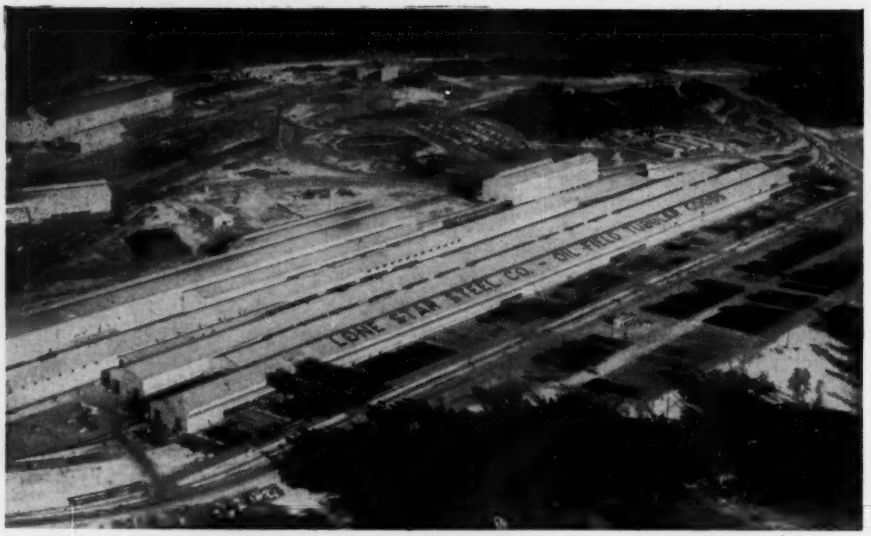

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Men at Work

● **E. Howard Fisher** has been elected vice president in charge of gas operations, for Pacific Gas and Electric Co. Formerly general superintendent of pipeline operations, Fisher succeeds the late Philip E. Beckman who died November 21.

E. H. Fisher

P. W. Martin

● **Porter W. Martin,** Southern Union engineer, has retired after more than 40 years of service in the engineering profession and in gas utility operations. Other personnel changes recently announced by Southern Union Gas Company include the appointment of **Roy Wiegand** of the Dallas home office to the newly created position of staff assistant for construction and maintenance; the transfer of **O. B. Wagner** of Durango, to Prescott as manager; and the transfer of **Floyd Yacconi** of Pecos to Durango to take over Wagner's former position as manager there.

● **Charles D. Brown** of Regina has been appointed advertising and publicity supervisor for Saskatchewan Power Corporation.

● Stockholders of Oklahoma Natural Gas Co. have elected the following to the board of directors: **Joseph Bowes,** chairman of the board, Oklahoma Natural Gas Co.; **A. E. Bradshaw,** chief executive officer, National Bank of Tulsa; **Luther T. Dulaney,** manager, Dulaney's Manufacturers and Distributors; **H. A. Eddins,** president, Oklahoma Natural Gas Co.; **George Frederickson,** vice president, Oklahoma Natural Gas Co.; **J. A. LaFortune,** independent oil operator, Tulsa; **Dean A. McGee,** president, Kerr-McGee Oil Industries, Inc.; **J. William Middendorf, Jr.,** investment banker, Baltimore, Md.; **John Mitchell,** investments, Middleburg, Va.; **F. W. Peters,** vice president and secretary-treasurer, Oklahoma Natural Gas Co.; and **L. C. Ritts,** investments, Tulsa.

● **Billy C. Werlla** of Werlla & Company, Houston, has been appointed sales representative for Blaw-Knox gas conditioning equipment in central and south Texas.

● **Steve Aichel** has been appointed manager of southeastern sales office in Jacksonville, Florida, for Cal-Metal Pipe Corporation of Louisiana. Aichel was formerly vice president and sales engineer for Aichel Steel & Supply Co.

● **H. W. Slack** and **M. C. Westrate** have been elected directors of Commonwealth Services Inc. Both are officers and directors of Commonwealth Associates Inc. engineering affiliates of Commonwealth Services.

● Continental Equipment Co., butterfly valve division of Fisher Governor Co., has promoted **Earnest M. Williams** to sales manager.

● **Arthur Thomas Jr.** has been appointed commodity sales manager of Kralastic materials for the Naugatuck Chemical Division, United States Rubber Co. He was previously manager of the division's Memphis, Tennessee, district sales office.

● **Henry Knippenberg,** former manager of the product line development for Dresser Manufacturing Division of Bradford, Pennsylvania, has been appointed president and general manager of Dresser-Ideco Co. of Columbus, Ohio. In August, 1959, he was transferred to the Dresser-Ideco Co. as assistant to the president. **John L. Pausch,** former president and general manager of Dresser-Ideco has been appointed to the newly-created position of chairman.

Henry Knippenberg

E. B. Mueller

● **Ebert B. Mueller** has been elected to the board of directors of Mueller Co. to fill the position vacant since the death of his mother, Mrs. Robert Mueller, earlier this year.

● **Jack D. Sparks** has been elected vice president for RCA Whirlpool appliance sales succeeding **John A. Hurley,** who recently announced that because of illness he was forced to reduce his work load and relinquish his position as vice president. Board chairman, **Elisha Gray** has announced that Hurley will become his special assistant early in 1960 and concern himself with long-range problems in distribution and industry relations.

J. D. Sparks

H. L. Bredlow

● **Howard L. Bredlow** has been appointed West Coast sales representative for meter and control diaphragms and industrial coated fabrics of the Vulcan Rubber Products Division of Reeves Brothers, Inc. He will cover California, Oregon, and Washington, from the Reeves offices in Los Angeles.

W. E. Steinwedell, 86, pioneer gas industry leader, died November 11, 1959. Born in Quincy, Illinois, January, 1873, Steinwedell graduated in electrical engineering from the University of Illinois, in the class of 1893. During his high school and university years, he worked for the Quincy Gas Company, which was managed by his father. Following graduation, he spent two years in Germany, working in and for utility companies, studying various methods and procedures.

On his return to the United States, he joined the Western Gas Construction Company as an engineer and salesman, continuing with them until 1902 at which time he and Messrs. Plantinga and Smith, formed The Gas Machinery Company. From that time until April, 1957, Steinwedell served actively with the company.

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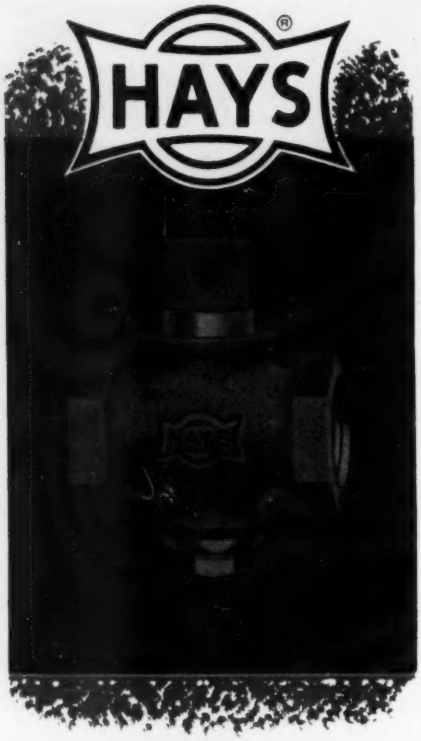

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Three-Way • Graduated Dial

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HAYS MFG. CO.
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BOOKSHELF

Significance of Waste Heat Recovery Methods to the Gas Industry, *published by Industrial and Commercial Gas Research of the American Gas Association, 420 Lexington Avenue, New York 17, New York. Pages, 52. Price, $3.*

Report summarizes heat recovery equipment now in use and points out that waste heat recovery is applied today not so much to reduce cost of fuel, but to increase production and improve product. Furnaces and other process equipment requiring heat with less than 15,000,000 Btu per hour input are seldom equipped with heat recovery devices. Design of equipment for smaller applications is analyzed and suggestions made on how marked economies may be effected by recovering waste heat for other applications beyond the immediate processing. Report is based on studies conducted at the Polytechnic Institute of Brooklyn, and is of value to industrial gas sales engineers and plant operators, particularly in metal-working and ceramics.

Organic Chemistry: A Brief Course, *2nd ed., by Ray Q. Brewster and William E. McEwen. Published by Prentice-Hall, Inc., Englewood Cliffs, New Jersey. Pages, 401. Price, $10.*

Second edition of textbook written by two professors of chemistry at the University of Kansas includes new material and has been rearranged so that the properties of aliphatic and aromatic compounds are presented in an integrated manner. Introductory chapter studies methyl and ethyl alcohols, whose simple transformations clearly reveal the important relationships existing among several prominent families of carbon compounds. Thereafter, various classes of hydrocarbons and their derivatives are presented in logical order. Illustrative materials have been brought up-to-date; an enlarged list of questions and problems is provided at the end of each chapter with the answers in the appendix. Brief geographical and historical footnotes have been used to convey to the student some knowledge of the history of chemistry.

Liquefied Petroleum Gases, NFPA, No. 58, *published by the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts. Pages, 80. Price, 50 cents.*

New edition of the standard that is widely used as a guide and as a basis for laws or regulations applied with the force of law in some 45 states and General Canadian provinces, incorporates 12 important changes. Included are provisions for use of interchangeable containers for above or below ground installations, acceptance of vapor-actuated LP-Gas transfer pumps under specified operating conditions, and the elimination of fuse plugs as part of the regular relief discharge requirements of containers except as supplementary devices.

Code for Protection Against Lightning, NFPA, No. 78, *published by the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts. Pages, 48. Price, 50 cents.*

This code, originally formulated in 1904, is the nationally accepted guide to proper installation of lightning rods and other lightning protection. The 1959 revisions deal principally with concealed installations, floating roof tanks, grounding of tanks, and pressure storage of flammable liquids and gases.

Flammable Liquids Code, NFPA No. 30, *published by National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts. Pages, 62. Price, 60 cents.*

The 1959 edition of the *Flammable Liquids Code* contains a number of significant changes including the addition of chemical plants and distilleries under requirements relating to refineries and other plants storing and handling crude petroleum. In addition, a new concept of tanks has been included in accordance with their pressures. Flammable Liquids Code is a recognized guide to safe practice in the storage and handling of gasoline and other flammable liquids and serves as a basis of law or fire marshals' regulations in a large part of the U. S. Has been revised periodically since 1913.

A Study of Effluents from Domestic Gas-Fired Incinerators, *published by American Gas Association, 420 Lexington Avenue, New York 17, New York. Pages, 27. Price, $1.50.*

Report is the final result of extensive research studies conducted at Battelle Memorial Institute on the composition of effluents from domestic gas-fired incinerators. Report indicates that very significant reduction in emission of air pollutants has been achieved as a result of new research developments. It also points out that compared to other combustion equipment, including automobiles, etc., the new domestic gas-fired incinerators have superior characteristics. When wet domestic wastes were incinerated, improved units were capable of achieving up to 6-fold decrease in rate emission of aldehydes compared to older gas-fired units. Decrease in organic acids was over 3-fold. decrease in saturated hydrocarbons, 8-fold, and although nitrogen oxides increased up to 3-fold because of increased gas temperatures in the afterburner, the concentration of nitrogen oxides was still low compared to most other combustion sources.

Plant Operations Test Manual, *published by the Natural Gasoline Association of America, 421 Kennedy Building, Tulsa, Oklahoma. 8½ by 11-in. loose leaf binder.*

More than 80 test methods used in the control of gas processing plants have been compiled by NGAA's Plant Control Committee headed by K. G. Bottenberg, Phillips Petroleum Company. Committee will keep test methods under constant review, and book holders will automatically receive future revisions and additions as required by changes in methods or plant needs. Tests originating with such organizations as American Society for Testing Materials; The Girdler Corporation; The Fluor Corporation, and Betz Laboratories are included.

Leakage from Underground Flammable Liquid Tanks, NFPA No. 329M, *published by National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts. Pages, 20. Price, 50 cents.*

New guide deals with problem of underground tank leakage, covers the proper methods for installing underground flammable liquid tanks, minimizing losses and detecting leaks, protecting contaminated areas, and detecting sources of seepage. Guide was developed by NFPA Sectional Committee on Maintenance and Repair, under the chairmanship of T. H. Wright of the Ohio Inspection Bureau.

COMING EVENTS IN THE GAS DISTRIBUTION INDUSTRY

February

1- 4 American Society of Heating Refrigerating & Air Conditioning Engineers, semi-annual meeting, Memorial Auditorium, Dallas, Texas.
1- 5 ISA instrument-automation conference, Houston, Texas.
29-Mar. 2 A.G.A. general management section conference, Pittsburgh-Hilton Hotel, Pittsburgh, Pennsylvania.

March

14-18 National Association of Corrosion Engineers, annual convention, Dallas, Texas.
21-23 Mid-West Gas Association, annual meeting and convention, Hotel St. Paul, St. Paul, Minnesota.
23 Oklahoma Utilities Association, accounting section, Biltmore Hotel, Oklahoma City, Oklahoma.
24-25 Oklahoma Utilities Association, annual convention, Biltmore Hotel, Oklahoma City, Oklahoma.
24-25 NEGA annual meeting, Hotel Statler, Boston, Massachusetts.
30-April 1 GAMA annual meeting, The Greenbrier, White Sulphur Springs, West Virginia.

April

5- 7 A.G.A. sales conference on industrial and commercial gas, The Shamrock Hilton, Houston, Texas.
8-9 Florida-Georgia Gas Association, annual convention, Biltmore Hotel, Palm Beach, Florida.
19-21 Southwestern Gas Measurement Short Course, University of Oklahoma, North Campus, Norman, Oklahoma.
19-21 A.G.A. Research & Utilization Conference, Hotel Carter, Cleveland, Ohio.
21-22 Indiana Gas Association, French Lick-Sheraton Hotel, French Lick, Indiana.
25-27 A.G.A.-EEI National Conference of Electric and Gas Utility Accountants, Roosevelt & Commodore hotels, New York City.
25-27 Southern Gas Association, annual convention, Galveston, Texas.
25-29 American Welding Society, 41st annual convention, Biltmore Hotel, Los Angeles, California.
27-29 NACE Portland Section Corrosion Control Short Course, Portland, Ore.
28-29 Pacific Coast Gas Association Distribution Conference, Benson Hotel, Portland, Oregon.

May

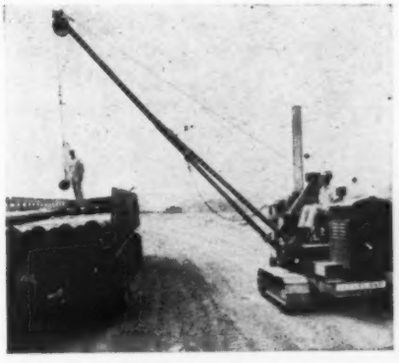
9-12 National Restaurant Show, Navy Pier, Chicago, Illinois.
9-13 ISA instrument-automation conference, San Francisco, California.
9-13 A.G.A. Operating Section Joint Distribution and Transmission Conference, Hotels Roosevelt and Jung, New Orleans, Louisiana.
12-13 A.G.A. eastern gas sales conference, Statler Hotel, Washington, D. C.
16-18 A.G.A. mid-west regional gas sales conference, Edgewater Beach Hotel, Chicago, Illinois.
16-20 National Fire Protection Association, annual meeting, Montreal, Canada.

Cleveland 80W lays pipe for 13-mile sewer line—does backfilling, too

G. C. McLeod Co. of Edmonton, Alberta made extensive use of its Cleveland 80W for laying 20" and 8" asbestos pipe on a 69,000-foot sanitary sewer line in Nanaimo, B. C. Even in the extremely wet and heavy mud of the salt water tidelands shown above, construction moved ahead 800—1,300 feet daily. As the line progressed into drier ground, the 80W was further employed in backfilling and cleanup operations.

THE ONE-MAN-OPERATED 80W

- **DOES SIDEBOOM WORK OF ALL KINDS,** unloads, strings, lays pipe, sets valves, hydrants, etc.
- **BACKFILLS SPOIL** clean and fast from *either* side of trench.
- **TAMPS SPOIL** simultaneously with pull-backfilling, or separately, as required.



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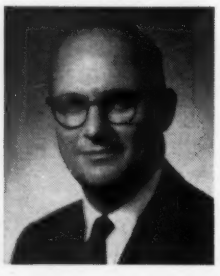
GAS INDUSTRY NEWS
SUPERIOR NOW A DIVISION OF NEPTUNE METER COMPANY
Superior Meter Company becomes Division of Neptune Organization

NEWS
FOR GAS UTILITIES

A message to our friends in the Gas Industry

from William H. Cochrane, President, Neptune Meter Company



I'm happy to announce that Superior Meter Company has been merged into Neptune Meter Company's corporate structure. Our former subsidiary will now be known as the Superior Meter Division of Neptune, and will have Walter H. Sieger, Vice President of Neptune and for 26 years a Neptune executive, as General Manager.

Neptune operates in many measurement fields. We have a wealth of experience in accurately measuring and controlling the volume, weight and temperature of gases, liquids and solids. We produce measurement instruments and systems for utilities, municipalities, agriculture; for industry and for defense.

Superior Meter Division operates with its own sales organization as a self-contained unit within our team. It will benefit in many ways by being a member of the team . . . through the use of our warehousing facilities and through the interchange of experience and knowledge gained from our research and development programs. Like the other divisions of Neptune, Superior will now have the technical and financial resources to exploit major advances in measurement. As a result, we are sure that you in the gas industry business will also benefit.

At Neptune we are proud of our position as a leader in the measurement field and as the world's largest manufacturer of liquid meters. And we are proud to have Superior as an integral part of the Neptune organization. For "superior" hardcase and tincase meters and meter parts, look for the name:

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for a better measure of profit

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LIQUID METERS
GAS METERS
ELECTRONIC SYSTEMS and COMPONENTS for MEASUREMENT and CONTROL

Special Report:

The Outlook for 1960

As a new "golden" decade unfolds, AGJ's editors review the reviewers and look over the outlookers in an examination of what to expect in this first year of the "sizzling sixties"

Dean Hale, *Editor, and* **Pat Loar,** *Assistant Editor*

As the "Golden Sixties" unfold, the 143-year-old gas business is prepared to accept the challenge of unprecedented growth and expansion, confident of strengthening its position as a major energy supplier to a dynamic, growing nation.

Almost fantastic growth is predicted during the coming decade. Population will boom, industrial expansion will be at record levels, and demand for energy will zoom to even greater heights.

In a prelude to the "sizzling sixties," gas chalked up a record year in 1959, as annual sales revenues topped the $5-billion mark for the first time and the total number of customers reached a peak 32,575,100 on December 31. At the year's end, the industry totaled its progress — sales up 8.9 percent with more than 87.4-billion therms sold, revenues up 11.3 percent to $5.085-billion, gross plant up 8.8 percent to $19.7-billion, and plans underway to spend more than $2.4-billion during 1960 for more improvements and expansion of facilities.

Record sales were attained for gas-fired appliances, natural gas made its entree into many new areas of the nation — notably Florida, many new house heating customers were added as more gas became available to existing markets, gas reserves climbed to a new high of 254.1-trillion cu ft, and construction added more than 6000 miles of new transmission lines and 18,000 miles of new gas distribution mains and services.

Growth of the gas distribution industry will continue at an accelerated pace during 1960. Highlights for the coming year are seen in the following figures:

- ... $1,139,000,000 to be spent by the gas distribution industry for expansion, replacement, maintenance, and various new facilities. Total gas industry expenditures will reach $2.4-billion.
- ... 11,600 miles of new mains to be installed.
- ... 7000 miles of new service lines to be installed.
- ... 870,000 new customers to be added.
- ... gross plant expected to reach $21.5-billion in 1960.
- ... $118,000,000 to be spent for underground storage development.
- ... PAR research budget increased to record $2,500,000.
- ... Gas industry TV budget at record of nearly $3,850,000.
- ... PAR national advertising program to be nearly $2,000,000.

General Economic Outlook

Heralded as the beginning of the "Surging, Sizzling, Star-Spangled '60's," the year 1960 has some big shoes to fill if it is to meet all the magnificent expectations of the economic seers and prophets who have put all their blue chips on the coming decade.

With the steel strike settled, and the business climate generally optimistic, 1960 should prove a year of growth for the nation's economy. It will be a time for expansion, for growth of the gross national product, and a time for making big plans and getting new products into the marketplace.

For certain, income will be higher and the outgo will also go up. Government spending will continue to increase, taxes won't be any lower, price indexes will continue creeping upward, and inflation will be a major economic and political issue with little being done about it.

Gas Faces Manifold Problems

Costs, rates, returns on investments, regulation, gas supplies, competition, and financing will continue to be everyday problems to the gas companies in 1960. In time, practically all of the big problems are solved, but the frustration of waiting for the solutions has not always been beneficial to the industry.

Costs . . . will continue to go up. Settlement of the steel strike means pipe and fittings and other products and materials made of steel will again be available — but at a higher price. Pressure for wage and salary boosts will also be felt at all levels and in all segments of the gas business.

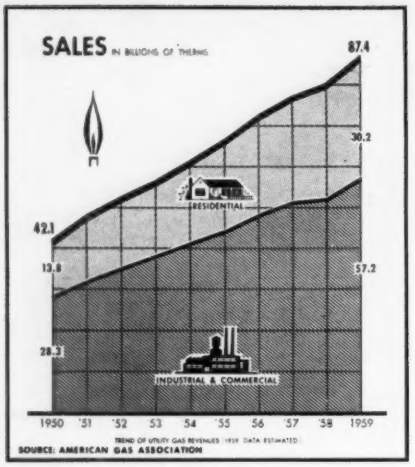
Rates . . . will continue to go up, too. New gas supplies are costing more, investment per new customer is reaching record highs, and operating costs continue to climb despite efforts to trim them. Regulatory lag in rate cases continues to put a squeeze on profits, and makes capital investment and financing of new issues difficult to obtain.

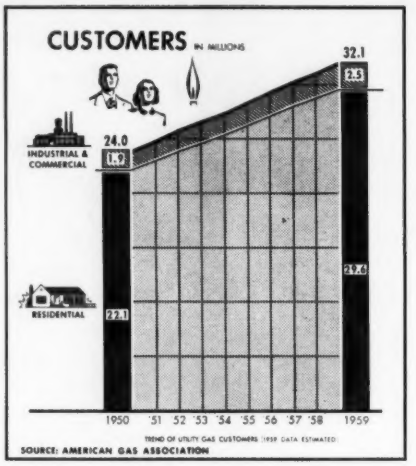
Competition . . . is on the increase. Electric utilities are preparing to wage a hot war in efforts to capture more of the home heating market to make use of its tremendous generating capacity that lies idle in the wintertime — a generating capacity needed primarily for meeting summertime air conditioning loads. Oil marketers and coal dealers are also making big plays for the heating load, especially in the northern and eastern states, sometimes using rough tactics.

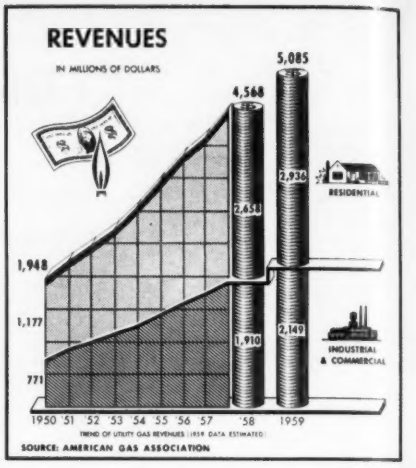
The coal industry — in a thinly-veiled effort to promote a "national fuels policy" — is attempting to gain through Congress and legislation what it cannot win in the market place. Coal producers, pointing to their "1000 year reserves," obviously are aiming at the oil and gas business in their efforts to obtain federal control of the end uses of natural gas and oil.

For the record: Significant 1959 Gas Industry Statistics

32,575,100	Customers on December 31	$5.085-Billion	Total Revenues for Year
11,600	Miles of New Mains Installed	8.8-Million	Unit Sales of Appliances for Year
7,000	Miles of New Services Installed	$19.7-Billion	Value of Gross Plant on December 31
783,100	New Customers Added	254.1-Trillion	Cu Ft Proved Recoverable Reserves
87.4-Billion	Total Sales in Therms for Year	$2.350-Billion	Construction Expenditures for Year







Being an election year, 1960 is not expected to produce any significant legislation affecting oil and gas. Independent producers will continue to struggle along under a synthesized type of utility control pending FPC decisions, higher court reversals and mandates, and continuing heckling by politicians. The regulatory entanglements in the FPC will continue for another year, assuredly.

The FPC, too, is not without its problems. At the beginning of 1960, it had pending some 100 pipeline rate cases, some dating back to 1954, and an unbelievable number of rate cases involving independent producers. Efforts by the FPC to conserve natural gas for better uses than boiler fuel were thrown a curve by a federal circuit court decision that the commission cannot control the end use of natural gas. The decision, expected to be appealed to the supreme court, could open the doors for purchase in the field by utilities of their own gas supplies and then arrange for "transportation only" via interstate gas transmission companies — something the FPC has long frowned upon.

The domestic petroleum industry in the U. S. exhibited a slight recovery in 1959 from its economic ill health of 1957-58 and made gains in most areas.

How the Petroleum Industry Is Faring

	1958	Est. 1959	Percent Change
Active Rotary Rigs	1,923	2,074	+8.2
Wildcat Wells Completed	9,588	10,125	+5.6
Development Wells Completed	39,523	42,135	+6.6
Oil Wells Completed*	25,270	26,850	+6.1
Gas Wells Completed	3,679	3,750	+2.0
Dry Holes Drilled	18,823	19,300	+2.5
Total Footage Drilled (1000 ft)	197,384	210,223	+6.7
Oil Production, Total, 1000 BPD	7,550	7,910	+5.0
Shut-in Capacity 1000 BPD	2,960	N.A.	N.A.
Total Imports 1000 BPD	1,650	1,746	+5.7
Domestic Demand 1000 BPD	9,025	9,280	+3.0
Total Demand 1000 BPD	9,350	9,630	+3.0

*Includes wells producing gas and oil simultaneously.

Gas Supply Outlook

Big news in 1960 in natural gas supply will undoubtedly spring from north of the border, where Canada's new National Energy Board is now in operation and will rule on pending applications for export of natural gas to the U. S.

Projects of major importance involving export of natural gas from Canada include:

. . . export of 204,000,000 cu ft per day by Trans-Canada Pipe Lines, Ltd., to be delivered to Midwestern Gas Transmission Company at Emerson, Manitoba on the international border. Gas would be sold throughout the upper midwestern area, principally Minnesota, Wisconsin, and parts of adjacent states. FPC has approved Midwestern's part of the project.

. . . export of 458,750,000 cu ft per day by Alberta and Southern Gas Company, Ltd., to be delivered to Pacific Gas Transmission Company at Kingsgate, B. C., on the border. Gas would be delivered ultimately to Pacific Gas & Electric Company in California. The FPC has not yet approved the U. S. portion of the plan.

. . . export of 36,000,000 cu ft per day by Canadian-Montana Pipe Line Company for delivery to its own existing system in Montana.

. . . export of 165,000,000 cu ft per day by Westcoast Transmission Company, Ltd., to be delivered at Kingsgate, B. C., to Pacific Northwest Pipe Line Corporation.

. . . export of up to 204,000,000 cu ft per day by Trans-Canada at Niagara, Ontario, on a "surplus gas" basis with no firm amount specified. Gas would be delivered to Niagara Gas Transmission for ultimate delivery to upstate New York.

Other major gas supply developments for 1960 include:

. . . construction of the Transwestern Pipe Line Company's 1600-mile system from West Texas and Oklahoma to California, providing 350,000,000 cu ft per day capacity. Project has been approved by FPC.

. . . proposed line by El Paso-Pacific Northwest Pipe Line from the Wyoming-Utah-Colorado area southwesterly to lower California, providing 400,000,000 cu ft per day capacity with half of the gas supply from Colorado Interstate Gas Company and the other half from Pacific Northwest's present and future Canadian gas supplies.

. . . plans to supply Anchorage, Alaska, with natural gas from the Kenai Peninsula gas fields through a 165-mile line.

. . . improved gas supply to eastern utility customers by Transcontinental Gas Pipe Line Corporation by a more than 700-mile system looping and expansion program for the 1960-61 heating season.

. . . extension of natural gas service to over 300 new communities in Iowa, Nebraska, the Dakotas, Minnesota, and Wisconsin by Northern Natural Gas Company, involving more than 2000 miles of new line.

Use of LPG by gas distribution companies increased to an estimated 245,000,000 gal during 1959, an increase of 2.6 percent over 1958. Extension of natural gas into Florida — previously the largest LPG-utility state — caused a sharp reduction there but gains in peak shaving in other areas were sufficient to produce a small increase in total usage.

Extension of natural gas lines and increased heating loads has stimulated interest in large volume storage facilities for peak shaving. One large mined storage cavern was placed in operation by Cincinnati Gas & Elecrtic Company during the year for storing LPG for peak shaving purposes. Pipeline transportation of LPG also increased, with several short LPG lines placed into operation and improvements and expansion of facilities made on the Little Big Inch pipeline

during 1959 (the line was converted from natural gas in 1958).

For 1960, gas distribution companies will add considerable more storage in the form of tankage — above and below ground— and cavern storage. At least one utility has built its own LPG supply pipeline interconnecting its peak shaving plants and connecting with an LPG terminal; other utilities have expressed interest in the idea for possible application to their own systems. Plans have been announced by the Katy Railroad to build an LPG line from the Southwest through the upper midwest to provide greater supplies of LPG to that area, including utility customers.

New Residential Construction

	1959	1960	Percent Change
1 & 2-family housing units	1,125,000	1,000,000	− 11
Multi-family housing units	240,000	250,000	+ 4
Total, Residential Construction	**1,365,000**	**1,250,000**	**− 10**

New housing unit construction is generally considered a fairly good guide to gas distribution growth and gas appliance sales. The trend in 1960 may not be as bright as 1959 in this respect, with a 10 percent decline in housing starts forecast. Chief reason for the decline is "tight mortgage money," not demand. Residential construction will drop to about 1,250,000 units in 1960, estimates the Department of Commerce. There will be more multi-family dwellings (apartments) built, but fewer single-family residences.

The trend to apartment buildings also applies to row-houses (side-by-side attached single-family houses) that are becoming more popular in the certain areas of the nation where builders are running out of suitable land, even in suburban areas.

Slightly over 1,000,000 one and two-family housing units are forecast to be built in 1960, a drop of about 11 percent, and slightly over 250,000 multi-family units will be constructed, a gain of about 4 percent. Dollar volume spending, however, will not decline more than 5 or 6 percent, indicating that the trend towards larger, higher quality, and more expensive houses will continue, keeping pace with increases in family income.

Improvement in the mortgage money picture, and possibly increased action by both private and government sources in replacing substandard housing with modern structures could improve the construction picture.

In other construction areas, gains will continue to be registered as industries expand and communities build more schools, hospitals, and religious buildings to meet civic needs.

Appliance Outlook

Appliance sales in 1960 will be as good as or better than 1959, most manufacturers predict. Largest increases are forecast for ranges and central heating equipment. Refrigerator sales will be up with four companies marketing new and improved models during 1960.

Gas appliance manufacturers, reports GAMA's director of marketing and statistics Edward R. Martin, do not view the coming decade with unbridled optimism, filled with spectacular and sudden sales proportions but, rather, see it as an era typified by relatively substantial and progressive increases in consumer demand and sales.

Gas appliance sales during 1959 were bright as manufacturers made a strong recovery from the 1957-58 business slowdown. Sales generally were above 1958 levels despite the impact of the steel strike on fourth-quarter operations of the appliance builders. Unit sales jumped to nearly 8,800,000 units, compared to some 7,800,000 units in 1958.

Built-in ranges, furnaces, boilers, and automatic water heaters reached all-time record sales in 1959. Many of the gains were closely associated with new home construction

U. S. Construction Picture for 1960

(Millions of Dollars)

	1959*	1960**	Percent Change
Residential			
Private	22,150	21,500	− 3.0
Public	1,000	900	− 10.0
Total	23,150	22,400	− 3.0
Industrial			
Private	1,950	2,450	+26
Public	340	375	+10
Total	2,290	2,825	+23.5
Commercial	3,850	4,450	+16
Religious	925	1,050	+14
Educational			
Private	530	600	+13
Public	2,675	2,750	+ 3
Hospitals			
Private	570	700	+23
Public	425	450	+ 6
Public Utilities			
Electric Light & Power	2,075	2,050	− 1
Gas	1,850	1,900	+ 2.5
Sewer & Water Systems	1,465	1,625	+11
Other Construction	14,345	14,575	+ 1.2
Total New Construction	54,150	55,375	+ 2.1

*Bureau of Census Statistics.
**Estimates prepared by Business and Defense Services Administration and U. S. Department of Commerce.

... and if predictions of a decline in new housing starts for 1960 hold true, it could affect the appliance industry in numerous respects. Regardless, gas equipment is expected to take a larger share of the new home appliance market in 1960 and subsequent years.

How the gas appliance manufacturing industry sees itself for 1960 is related as follows:

Ranges — Total industry sales expected to increase 2.9 percent to 2,145,200 units. Built-in range sales are expected to gain 19.3 percent over 1959, reaching a volume of 431,300 units. Free-standing range sales will remain fairly stable, declining 0.6 percent.

Central Heating Equipment — Shipments of gas-fired equipment (warm-air furnaces, boilers, and conversion burners) are expected to be basically unchanged from 1959 figures, with approximately 1,388,800 units to be shipped. Gains will be made in warm-air furnaces (up 0.5 percent), and in gas boilers (up 3.3 percent), while gas conversion burner sales will probably decrease about 7.4 percent from 1959 volumes.

Automatic Gas Water Heaters — Sales will be basically unchanged, say manufacturers, and could range anywhere from an 0.1 percent decline to a 4.6 percent increase.

Direct Heating Equipment, Unit Heaters, Duct Furnaces — Sales in this group are expected to increase during 1960 about 1.2 percent above 1959 figures, with an estimated 1,482,800 units to be shipped.

Wall Heaters and Floor Furnaces — Declines in sales are seen by manufacturers of vented recessed gas wall heaters and gas floor furnaces. The wall heater makers see a slight decrease in sales of 1.5 percent — to 452,600 units — while gas floor furnace builders are less optimistic and expect a decrease of 13.4 percent, to approximately 86,000 units.

Incinerators — Most manufacturers of gas-fired incinerators expect sales to continue increasing, with an overall increase of 8.4 percent seen during 1960, with some 52,800 units to be built.

Commercial Ranges — Increased volumes in commercial range equipment are foreseen by most manufacturers, with sales of 33,700 units anticipated, for a 1.5 percent increase.

New Developments in Appliances

... at least four manufacturers will offer gas refrigerators

Outlook For Gas Appliance Sales

	1959*	1960 (Est.)	Percent Change
Domestic Gas Ranges	**2,085,100**	**2,145,200**	**+ 2.9**
Free Standing	1,723,700	1,713,900	− 0.6
Built-In	361,400	431,300	+19.3
Automatic Water Heaters	**3,016,000**	**3,012,500**	**− 0.1**
Central Heating	**1,390,300**	**1,388,800**	**− 0.1**
Warm Air Furnaces	1,099,200	1,104,500	+ 0.5
Boilers	137,900	142,400	+ 3.3
Conversion Burners	153,200	141,900	− 7.4
Householeating	**2,024,500**	**2,021,400**	**− 0.2**
Direct Heating	1,465,900	1,482,800	+ 1.2
Recessed Wall Heaters	459,300	452,600	− 1.5
Floor Furnaces	99,300	86,000	− 13.4
Clothes Dryers	**480,000****	**495,000**	**+ 3.0**
Combination Washer-Gas Dryer	**50,000*****	**64,000**	**+28.0**
Incinerators	**48,700**	**52,800**	**+ 8.4**
Gas Unit Heaters	**136,800**	**141,100**	**+ 3.1**
Duct Furnaces	**24,100**	**25,500**	**+ 5.8**
Commercial Gas Ranges	**33,200**	**33,700**	**+ 1.5**
TOTAL	**9,288,700**	**9,380,000**	**+ 0.9**

*GAMA 10 month actual, 2 months estimated (Gas Appliance Manufacturers Association).
**American Home Laundry Manufacturers Association, estimated 1959 figures.
***AGJ estimate of gas units in total combination washer-dryer sales.

in 1960 — Norco, Inc., Kirk Industries, Whirlpool Corporation, and Borg-Warner's Norge Sales Corporation.

. . . new low-temperature controls will permit homemakers to maintain oven temperatures as low as 140 F, allowing them to prepare meals in advance and hold them at proper serving temperatures for hours.

. . . new 30-gal automatic water heater will allow homeowner to vary unit's recovery rate to meet changing hot water requirements in the home. Unit has adjustable burner with input settings ranging from 36,000 to 60,000 Btu per hour, providing recovery rates comparable to 40 and 50-gal models.

. . . direct-spark ignition for clothes dryers eliminates need for a constant-burning pilot or electric glow-coil ignition system.

. . . infra-red burners of the Schwank design are being used in a new vertical broiler for domestic ranges; design allows both sides of meats to be broiled simultaneously, reduces broiling time.

. . . new high-speed oven for commercial use uses forced convention principle of heating to increase output by cutting roasting and baking time. Hot air currents circulating through the oven interior cut production time by as much as 40 percent.

. . . new commercial gas-fired hot water heater uses new principle of heat transfer, obtaining faster recovery by using intermediate water coils for heat exchangers, has recovery rates ranging from 375 to 2125 gal per hour through a 100 F temperature rise.

Industry Research

The 1960 PAR research budget has been set at $2,500,000, up nearly 40 percent from the $1,800,000 budgeted in 1959, and represents the first step in raising the level of cooperative research expenditures to $6,000,000 by 1965. Total research outlay for 1960 by the entire industry — A.G.A., individual gas companies, and gas appliance and equipment manufacturers — will be over $5,000,000. This figure is expected to reach $14,000,000 or more by 1965.

Nearly 70 projects were included in research conducted under the PAR plan in 1959. Important developments include:

Air Conditioning. Two new items were brought to prototype stage and turned over to manufacturers for production or further development. Robertshaw-Fulton Controls Company has been granted an exclusive license to manufacture and market the free-piston engine-compressor developed for A.G.A. by Battelle Memorial Institute. Continental Motors has placed in production a long-life gas engine, developed under PAR sponsorship. A. O. Smith Corporation is continuing research and development on the Swiss 'sorption system. Other projects underway include an air-cooled absorption system, a vertical in-line engine-compressor, new absorption system refrigerants, and new cooling methods.

Heating. At the A.G.A. Cleveland laboratories, a small, self-contained, all-gas forced air furnace that generates electricity to operate its own warm air circulating fan has been demonstrated. The furnace uses thermoelectric devices to convert heat directly to electricity. Result is a wide range of new design concepts for appliances in which gas can serve as the sole source of heat, electrical, and mechanical energy.

Gas Operations. Projects of interest to gas companies include research on continuing development of base load processes for producing high-Btu synthetic gas from oil shale and coal. Leak detection and protection of gas distribution systems is being given increased emphasis. Other research projects include studies of design rules for branch connections, studies of the effects of meter tube roughness on measurement, development of a device for non-destructive inspection of steel pipe, and studies for development of new types of casings for pipe crossing highways and railroads.

Utilization. Research in the domestic, commercial, and industrial utilization fields has centered on development of range top components, including new burners, thermostats and ignition systems, advances in water heater corrosion prevention, development of high-speed commercial baking and cooking techniques and equipment, and improved processes and equipment for industrial applications.

Appliance approval testing and preparation of standards continued at an accelerated pace at the A.G.A. laboratories during 1959. More than 5000 gas appliances and accessories were tested, with heating equipment accounting for more than 50 percent of the appliances approved. A trend toward design of heating equipment incorporating sealed combustion chambers was noted.

Revisions and additions to 20 approval and listing standards, and a new standard covering gas-fired absorption-type summer air conditioning equipment were adopted by the approval requirements committee and approved as American Standard (ASA). Also approved was the third edition of installation standard Z21.30, covering installation of gas piping and gas appliances.

Research at the A.G.A. laboratories included 20 PAR projects in the domestic, industrial, and commercial fields.

Coordinated gas industry sales promotion, research, and public information activities were produced for the 15th year by the A.G.A. Promotion, Advertising, and Research (PAR) program in 1959, representing an outlay of more than $7,000,000. The national print advertising programs placed more than $1,800,000 in ads in national consumer publications, and more than $3,200,000 was spent on the national television program, *"Playhouse 90."* During 1960, A.G.A. will sponsor the first half-hour of 32 *"Playhouse 90"* programs on a new alternate-week schedule.

Developments to Watch. More liquefied natural gas shipments will be made to Great Britain during 1960, and the British Gas Council plans to build one, and possibly two, liquid methane tankers to increase its imports. Export of LNG to other areas of the world will be explored during 1960 and action taken in some cases. Studies on uses of LNG by domestic gas utilities for peak shaving and even base load will be intensified.

More attention will be given to development of energy conversion devices in the next 10 years, with fuel cells and thermoelectric devices developed for commercial uses.

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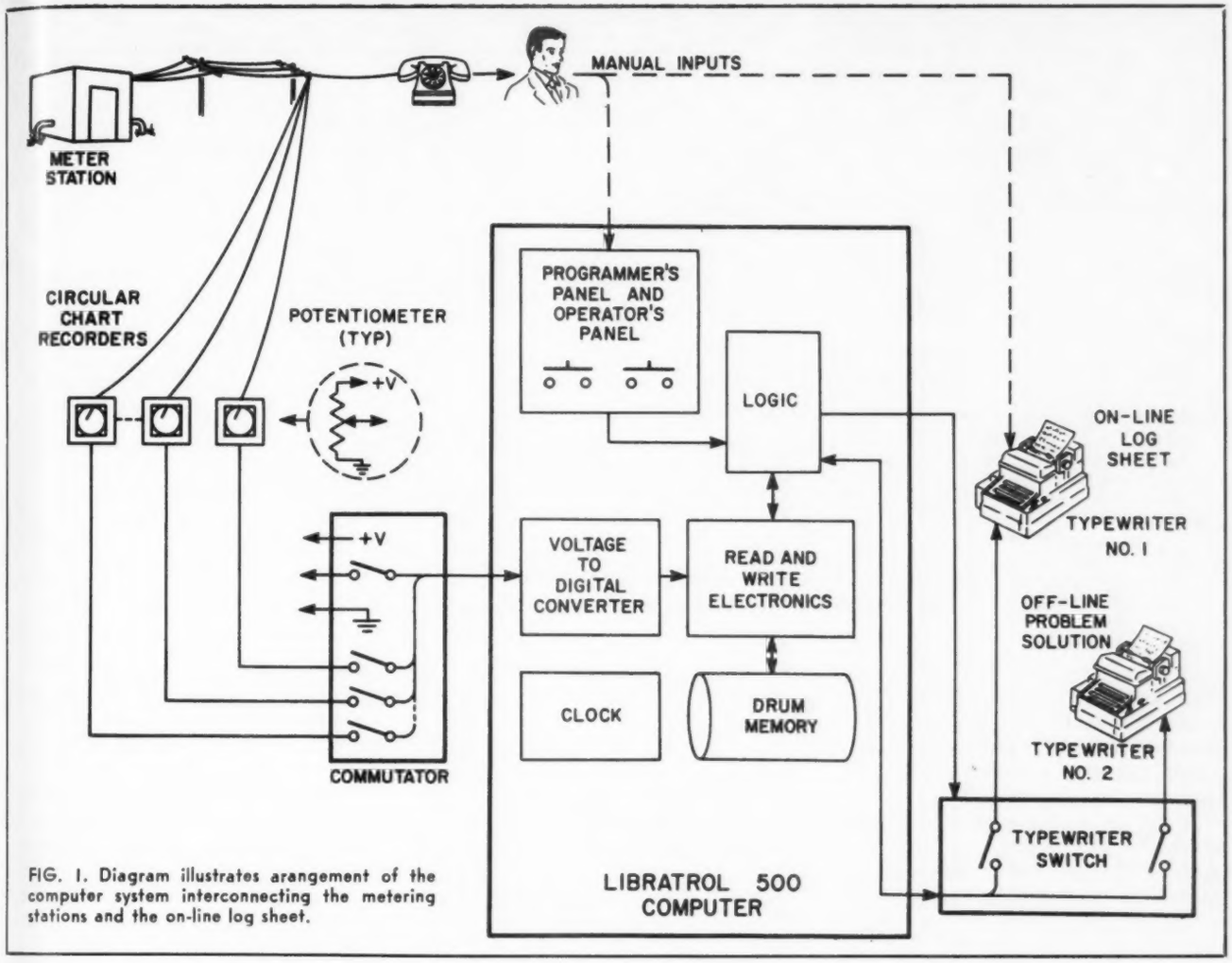


FIG. 1. Diagram illustrates arangement of the computer system interconnecting the metering stations and the on-line log sheet.

First Computerized Gas Dispatching System

Public Service Company of Colorado installs computer system to monitor metering stations, calculate gas flow, and aid gas dispatcher in controlling peak demands

Bill Karcher, *Dispatching Engineer, Public Service Company of Colorado, Denver, Colorado*
and
Hugh Jacobson, *Systems Engineer, Librascope, Inc., Glendale, California*

EDITOR'S NOTE: This is the first of two articles discussing application of the general purpose digital computer and associated equipment to gas dispatching operations of Public Service Company of Colorado and its subsidiaries. In a subsequent issue, operating experience and additional details on individual equipment items will be presented.

IN THE "MILE-HIGH" CITY OF DENVER, COLORADO, in the quiet but busy atmosphere of the gas load dispatching center of Public Service Company of Colorado, history is being made in the gas distribution industry.

The first computerized system ever used in on-line gas dispatching control is being used by Public Service and its subsidiaries to monitor gas flow meters at purchase points throughout the greater Denver area and the state of Colorado.

Quickly, quietly, and competently, electronic equipment receives a variety of data from every vital point on the gas distribution system, computes the gas flow at each point in less than the wink of an eye, and furnishes a typed report for the gas load dispatcher that serves as both a working tool and a permanent record.

The system, utilizing a *Libratrol-500* computer system, calculates the total hourly and accumulated demand for each hour of the day. With the com-

GAS LOAD DISPATCHING TYPEWRITER LOG

1:00 A.M.

North N1	N2	N3	N4	North Total	Hampden H1	H2	H3	H4	H5	H6	Hampden Total	Arsenal - 6th			Denver Total	24 Hr. Total (12 Mid. Only)
XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	

Arapahoe	Cherokee	Zuni	Total	Net	24 Hr. Total (12 Mid. Only)
XXXX	XXXX	XXXX	XXXX	XXXX	

Cy. S.T.B. 1	2	Total	W.T.B. 1	2	Total	Frontier 1	2	Total	Cy.	24 Hr. Total (9:00 A.M. Only)
XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	

Pueblo S 1	S 2	S 3	Total	Devine	Pueblo	24 Hr. Total (9:00 A.M. Only)
XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	

SL L 1	L 2	Total	Greeley G 1	G 2	Total	Mesa M 1	M 2	Total	C.W.G.	24 Hr. Total (9:00 A.M. Only)
XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	

FIG. 2. Example of typewriter log sheet furnished to dispatcher by the computer.

puter taking over the chore of making these tedious, routine calculations, the dispatcher is able to apply his experience and judgement to making important decisions in matching supply to demand.

It also enables him to control peak system demands without incurring high demand charges. Public Service buys its gas on a two-part rate that includes a straight commodity charge plus a demand charge based on the peak demand established during any one day in a year. The demand charge is then applied over the other 11 months. Thus, a severely high peak demand during just one hour of one day in a year can directly affect operating expenses for the entire year.

As a result, it is urgently necessary to insure control of peak gas usage in the gas distribution system at all times. To do so, Public Service monitors its demand on a 24-hour basis throughout the year. Adjustments are made by interrupting service to industrial customers who buy gas at preferential rates on an interruptible service basis by agreeing to curtail use whenever demand in the utility's area approaches the condition of exceeding a pre-established peak usage point.

Dispatcher Is Key Man

The gas load dispatcher must monitor the hour-by-hour demand, anticipate unusual demands due to weather conditions, and evaluate the hourly load increase in terms of necessary industrial curtailment.

Data from various purchase and delivery points on the system—in the form of static pressure, differential pressure, temperature, etc. — is telemetered to the dispatching center where the flow must be computed for each point to determine the total system demand.

Currently, 55 telemeters are monitored every six minutes. In the past, instruments providing necessary telemetered data had to be read hourly and the flow value at each point computed. The number and complexity of the calculations involved consumes from 30 to 45 minutes of each hour. This puts a heavy burden on the dispatcher, who must also devote a large portion of his time to making decisions that will control the demand and maintain adequate gas supplies in the gas distribution systems under his supervision.

Rapid growth of the Denver area has brought about a concurrent acceleration in the size and complexity of Public Service's gas distribution supply system. This increase has not only resulted in increases in the number of meter runs that must be monitored, but it also has increased the number of factors influencing the decisions of the dispatcher in maintaining satisfactory service.

Utilizing the computer to do all the routine, complex, and repetitive work insures that the dispatcher's time can be devoted to problems requiring his judgement and allows the dispatching department to do a more efficient job with available personnel. In addition, reports are available every six minutes instead of once each hour — 10 times as many reports with the same personnel.

Computerized Process Control

In optimizing process control, the key to success is matching data processing with the time-control requirements. Vast amounts of data reflecting variations in the process, must be collected, analyzed and displayed to permit control decisions to be made in time to effect corrective and optimizing action.

When large numbers of variables with rapidly changing values are involved, the factor of time is especially important. Time lost in the preparation of data suitable for making decisions results in possible losses in quality, reliability, efficiency and safety.

Primary advantage of computerized process control is that it permits control decisions to be made at rates that match the time constants of the process and system involved. These time factors vary from process to process, and each process control situation requires control elements custom tailored to particular specifications. The Libratrol-500 system utilized at Public Service was developed to cope with the large number of variables and rapid computation common to the majority of process problems.

Application of Computer

To apply a computer to any process, it is first necessary to completely describe or define two things—the process or system to which the computer will be attached, and the desired functions of the computer.

In the Public Service gas distribution system there are 16 metering stations containing a total of 35 meter runs. Of these runs, 30 have orifice plates and 5 runs consist of pipe, parallel to the orifice, which are calibrated with respect to the orifice but are not continuously measured.

Basic dynamic data required in the Denver computer room and furnished by means of Bristol Metameters or tele-

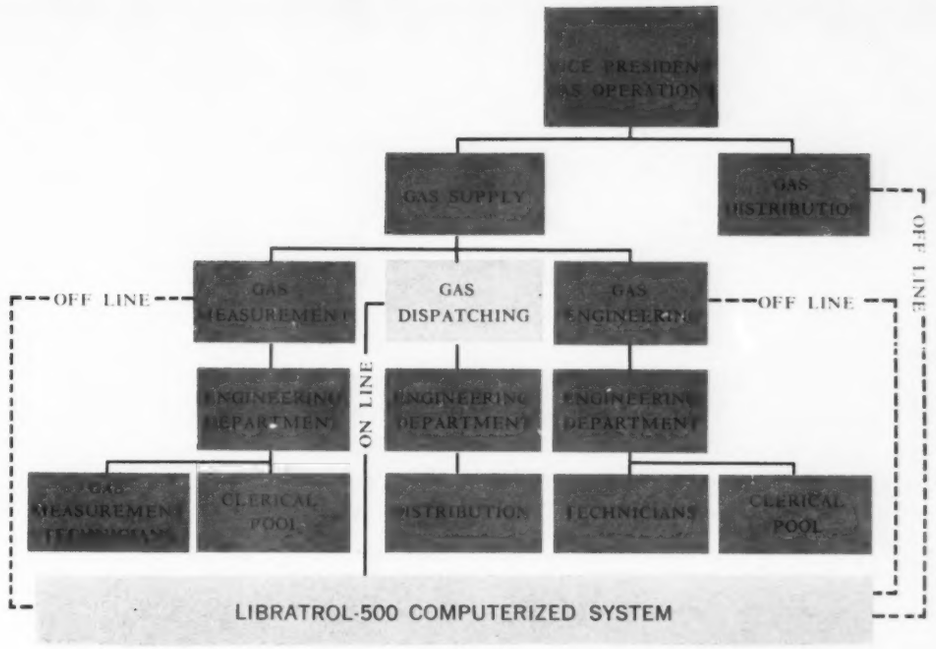


FIG. 3. Block diagram illustrates the on-line and off-line operations of the computer system. In each six-minute period, the computer uses one minute for flow calculations; the other five minutes can be used for engineering calculations.

phone includes differential pressure, temperature, and specific gravity for each meter run.

This data is furnished to the computer and is also indicated on circular chart data recorders in the dispatcher's office.

Computer System Output

Desired output for the computer system is in tabulated data form as shown in Fig. 2. The data chart presents total hourly gas flow and a 24-hour total gas flow for each of the 16 meter stations, plus combinations of the data.

In assisting the gas load dispatcher, the computerized system assumes the responsibility for monitoring the flow information, performs the calculations, and presents the demand data to the dispatcher. This permits the dispatcher to devote the major portion of each hour to the critical decisions affecting proper study and distribution of the gas.

A block diagram of the complete system required to interconnect the gas distribution system and the log sheet by means of desired program calculations is shown in Fig. 1.

Flow data for the computer is provided from circular chart recorders. Each recorder is fitted with a retransmitting potentiometer that generates an output voltage proportional to the value of the flow parameter being monitored by the recorder.

The potentiometer output feeds to a voltage-to-digital converter of the successive approximation type. The converter translates the input voltages into digital signals that feed directly to the computer. The time to convert the voltage from the retransmitting potentiometer into digital signals representative of the data value is only one millisecond. The digitalizing process is initiated on command from the computer.

Computing Demand Data

A 72-channel commutator permits the computer to obtain data from any of the data sources on command. The 72 data sources consist of 55 retransmitting potentiometers that provide static pressure, differential pressure, and temperature data from the recorders. Five channels which indicate the throw-over runs at a given meter station are in operation. There are 12 spare channels for future metering operations.

The programmer's panel contains all manual control functions needed to initially enter a program into the computer or to modify a program in any desired manner. The computer portion of the system includes the drum memory, read-write electronics, logic, and flip-flops.

The system includes two Flexowriters that provide typed, permanent records. They serve the function of "on-line" and "off-line" program readout. Selection of the typewriter to be used is by program control.

During the sixth minute of each six minute interval in an hour, the computer samples each of the data sources for the differential and static pressures recorded at the flow meter. The square roots of the two pressure measurements are determined and used to calculate a flow value, Q. At the end of each hour period, the computer sums the values for each flow meter. In addition, at the end of each hour, the hourly flow and accumulated flow is presented to the dispatcher. The flow accumulation cycle is repeated every 24 hours.

The computer determines flow values in accordance with the formula given in A.G.A. Gas Measurement Committee Report No. 3, which is:

$$Q_h = C'\sqrt{h_w P_f}$$

Where:

Q_h = quantity rate of flow at base conditions in cu ft per hr
C' = orifice flow constant
h_w = differential pressure in inches of water at 60 F
P_f = absolute static pressure in psi

This equation is solved by the computer each six minutes for each of the metering points. The values of differential pressures and static pressures are telemetered from the orifice meters at the purchase points.

Basic to the calculation of the flow is the orifice factor, C′, which defines the relationship between the pressure measurements and the flow on the basis of the characteristics of the gas, of the flow meter, and the flow itself.

The orifice flow constant is defined as the rate of flow in cubic feet per hour under base conditions when the $\sqrt{h_w P_f}$ equals one. As given in A.G.A. Report No. 3, the orifice flow constant is a function of nine flow and orifice parameters, all of which must be considered in computing the values of the constant.

These parameters are defined as the basic orifice factor (F_b), Reynolds number (F_r), expansion factor (Y), pressure base (F_{pb}), temperature base (F_{tb}), flowing temperature (F_{tf}), specific gravity (F_g), super-compressibility (F_{pv}), and manometer factor (F_m).

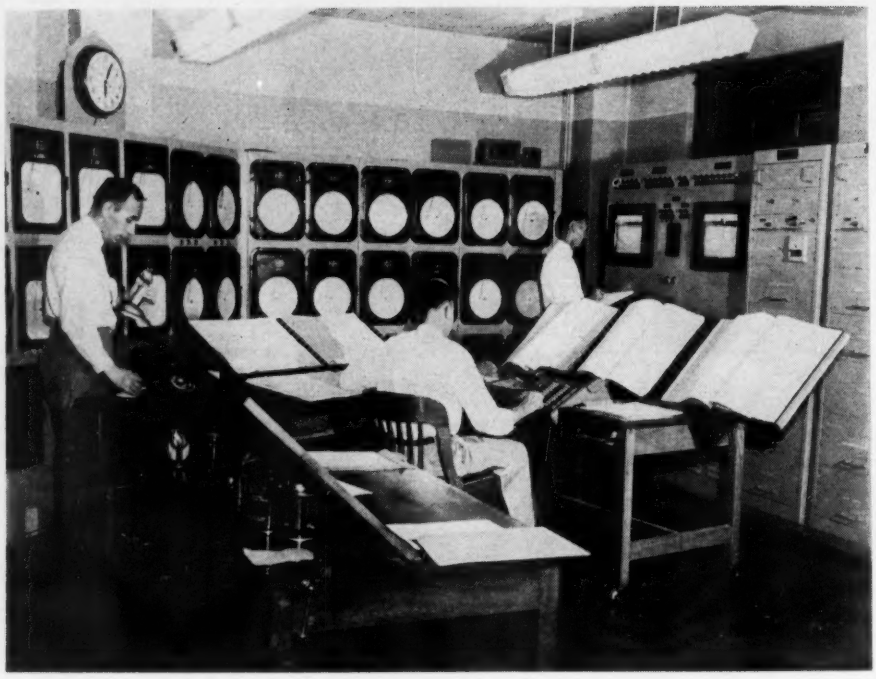


FIG. 4 Dispatching center prior to installation of computer. Increased demand activity requires three men to monitor data, calculate flow and demands, and make decisions. Use of computer will allow dispatchers to devote time more effectively in evaluating gas demand and making control decisions to hold peaks to minimum levels.

These factors influence the value of the constant in rather complex ways and the computer has been programmed to compute the effects of the factors and the final value of the constant.

Temperature, static pressure and differential pressure change the orifice factor. The computer monitors and calculates the orifice factor every six minutes. Previously, two engineers worked 45 minutes to manually turn out computations now processed by the computer in one minute.

"Doubles In Brass"

The extreme speed at which the computer can complete the monitoring and calculations involved in determining the demand leaves it with approximately five "free" minutes out of every six to accomplish additional computing tasks. To take full advantage of this, the utility is programming the computer to carry out the prime objective of demand calculations, and in addition, perform valuable engineering calculations for several other divisions of the company.

A "time box" program has been established to set up a priority sequence of programs for the computer to follow. This program makes it possible for the computer to perform the monitoring and calculation during each sixth minute and again at the end of the hour. It then takes up additional computational work in the vacant five minutes before sampling periods.

One of the most important engineering problems that the computer aids in solving is analysis and design of the gas distribution system using the Hardy Cross method.

While the computer cannot display the originality or creativity of its human operators, it does excell in the area of rapid and accurate calculation. For this reason the Hardy Cross technique is used quite successfully in the computer. Rapid and accurate analysis of the distribution system performance aids the Denver area by providing increased and more reliable gas service.

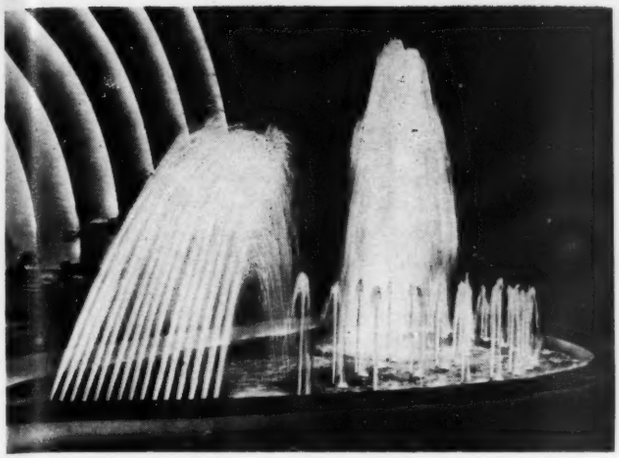
System Designed To "Grow"

One advantage of the computerized dispatching control system, as installed, is that it can serve as the cornerstone for building a more sophisticated process control. Results of the present system can be utilized to install more fully automatic control as requirements are evaluated and basic operating criteria established.

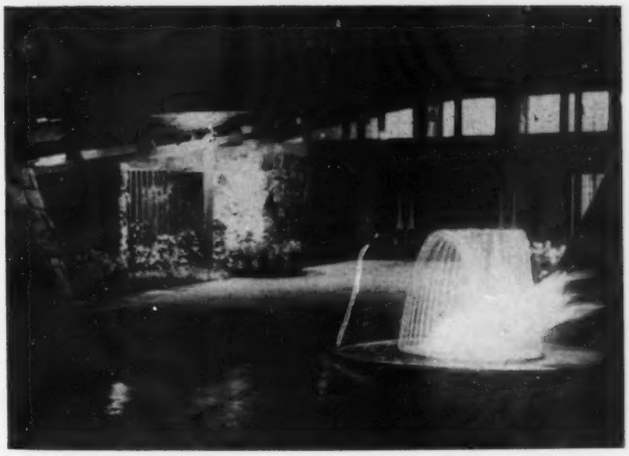
Eventually, it could be used for computer-directed control, whereby the computer — using data monitored by instrumentation plus information stored in the computer — is used to calculate optimum set points in the process for maximum efficiency, maximum output, or to reach a desired condition in minimum time. This information would be presented to the operator, who would alter controls manually to meet conditions directed by the computer.

Once the relationship between primary and secondary effects of control variations are studied and understood, the system could be further refined to put the computer in full control of the process. With the control loop closed through the computer, automatic trimming operations are carried out by monitoring set-points and changing them as required. * * *

FIG. 5. Console of the Libratrol-500 computer system is examined by J. T. Ator, manager of systems engineering for Librascope, Inc., and Hugh Jacobson, systems engineer. Desk-size console containing computer, basic element of the system, is located in the dispatching room in Denver.



Flaming fountain at world famous Hollywood Bowl creates spectacular prelude to concerts under the stars as splashing spray and colored lights combine with burning jets and natural gas inside central cone of water. Gas flames vary from low circle of fire to 30-ft torch.



Fire and water blend in 6-ft diameter hand-hammered copper braziers at each side of the entrance to the Empire Club in Dallas, adding glamour to the Polynesian-Oriental atmosphere of the unique circular structure.

Flaming Fountains ... fire and water displays are spectacular attention-getters, provide new load building ideas for gas utilities

FIRE AND WATER FOUNTAIN DISPLAYS, spectacular and appealing, are adding a new dimension to outdoor decor for building entrances, park and recreational area attractions, and for highlighting landscape architecture. Another example of the dramatic role that natural gas is playing in today's modern living, the flaming fountains provide a new source of gas load and revenue for gas utilities everywhere.

At the world famous Hollywood Bowl, a flaming fountain that blends dancing fire with constantly changing sprays of water has been added to provide a colorful splash to the Bowl's normally spectacular program openings.

Dedicated to Dorothy Chandler, permanent chairman of the Bowl, the gas-lit fountain was designed by Henry Drefus with special lighting effects engineered by F. X. Morris, sales engineer with Southern California Gas Company, and contractor J. S. Hamel of Burbank, California.

Controlled from a central panel, gas flames vary from a low flickering circle of fire to a 30-ft torch that blends with the dancing waters of groups of aerated sprays—three groups at each end of the pool and along the front, and a fourth grouping in the center.

The gas torch, which burns inside the center water cone and through the water itself, operates at 2 psi and burns through a modified flame retention type burner. No primary air or premix system is used; complete combustion is obtained with secondary air. Ignition is provided by four low-voltage glow rods, partially protected by metal deflectors. To prevent water run-back into the piping system from the submerged burners, a circle seal check valve is included in the design of the equipment. During maximum operation, gas consumption is approximately 9000 cu ft per hour.

Flaming fountains of smaller dimensions but no less appealing highlight the entrance to the Empire Club in Dallas. On each side of the 14-ft walkway leading into the club are 6-ft diameter hand-hammered copper braziers, each cradling a 3-ft diameter circular water fountain that sprays a 3-ft high cone of water falling into an 18-in. high gas flame in the center of the fountain.

The fountains provide a dramatic highlight to the Polynesian-Oriental effect of the entry to the club whose membership is comprised of personnel in firms having offices in Empire Central, a new office building development of Windsor Properties, Inc., located in the booming industrial properties area of northwest Dallas.

Designed by Naud Burnett II, Dallas landscape architect, the fountains are manually operated from a key valve box for the natural gas, located near the fountain, with water for the fountains provided by a recirculating pump in a nearby equipment room.

As shown in the accompanying diagram, the four main burners are standard shower heads. For pilot burners, four standard orifice burners are used, protected from the falling spray by a copper "cap" or deflector. Burner capacity is 30 cu ft per hr at pressure of 8-in. w.c. Operating cost of the fountains is estimated at 2.5 cents per hour.

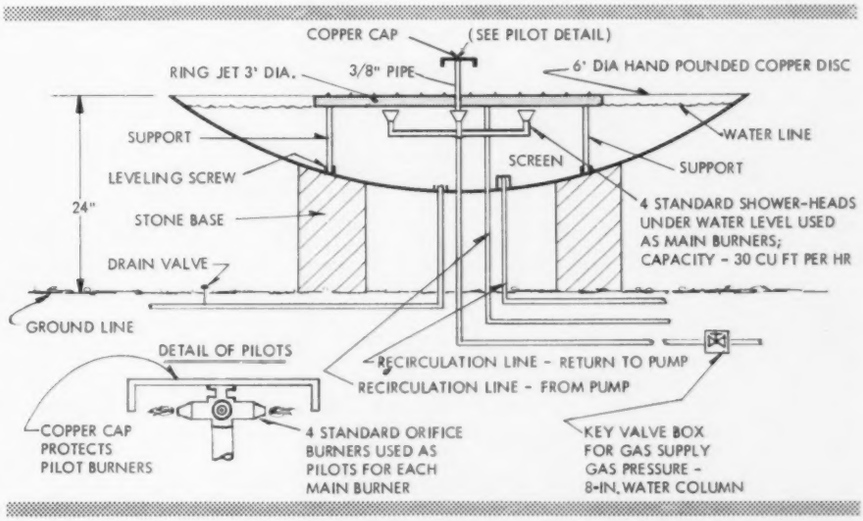

COPPER CAP
(SEE PILOT DETAIL)
RING JET 3' DIA.
3/8" PIPE
6' DIA HAND POUNDED COPPER DISC
SUPPORT
WATER LINE
SCREEN
SUPPORT
LEVELING SCREW
24"
STONE BASE
4 STANDARD SHOWER-HEADS UNDER WATER LEVEL USED AS MAIN BURNERS; CAPACITY - 30 CU FT PER HR
DRAIN VALVE
GROUND LINE
DETAIL OF PILOTS
RECIRCULATION LINE - RETURN TO PUMP
RECIRCULATION LINE - FROM PUMP
COPPER CAP PROTECTS PILOT BURNERS
4 STANDARD ORIFICE BURNERS USED AS PILOTS FOR EACH MAIN BURNER
KEY VALVE BOX FOR GAS SUPPLY GAS PRESSURE - 8-IN. WATER COLUMN

Diagram illustrates design of the Empire Club's simple but effectively dramatic flaming fountains.

Entrance to the Gas Appliance Center is highlighted by this modernistic wrought-iron free-form sign. Admiring the entranceway, left to right, are David J. Kerr, Southern Union Gas Company, president of the center's management corporation; Loyce Campbell, secretary-hostess for the center, and Trammell Crow, owner and developer of the Dallas Trade Mart in which the center is housed.

Gas Appliance Center In Dallas Formally Opened As Industry's Permanent Showcase

Dean Hale, *Editor*

FIRST PERMANENT SHOWCASE FOR THE GAS INDUSTRY, *The Gas Appliance Center,* was formally opened in mid-January in the new $18,000,000 Dallas Trade Mart. Financed and managed by Gas Industry Exhibitors, Inc., the 25,000 sq ft Center is the only year-around, permanent display of its kind in the nation.

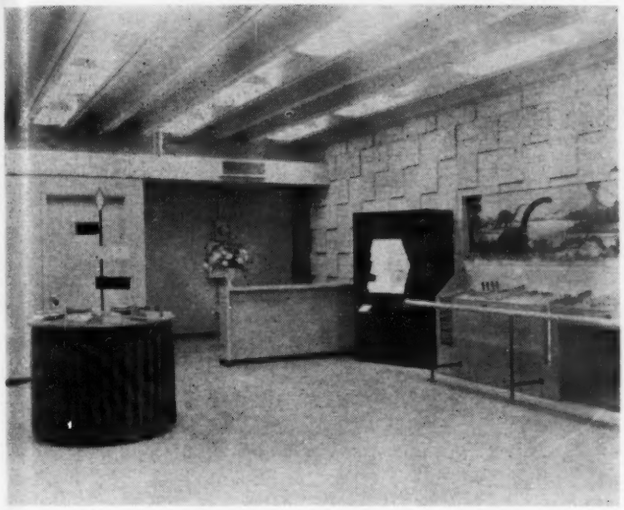
Dedication ceremonies, held before an enthusiastic audience of 150 civic leaders and gas industry executives, were barely over before the new Center was put through its first major campaign — visitation by some 9000 buyers attending the Winter Home Furnishings and Furniture Market at the Trade Mart. Greeting them with displays in the Center of ultra-modern gas-fired equipment were 22 manufacturers.

L. T. Potter, left, president of Lone Star Gas Company and of the Dallas Chamber of Commerce, welcomes Edward A. Norman, president of the Gas Appliance Manufacturers Association, to Dallas and the Gas Appliance Center. Gas light in background was lighted at formal dedication ceremonies as symbol of the gas industry.

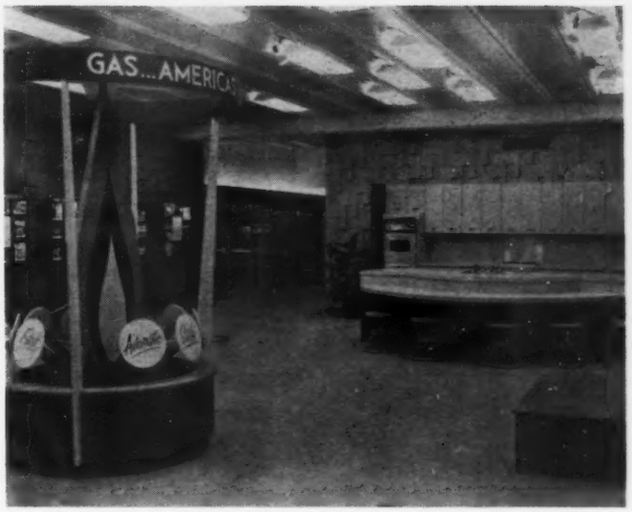
Principal speaker at ceremonies to mark the official opening of the exhibits was Edward A. Norman, president of the Gas Appliance Manufacturers Association. Welcoming guests and exhibitors to Dallas was L. T. Potter, president of Lone Star Gas Company, who extended greetings in that capacity and as president of the Dallas Chamber of Commerce and as first vice president of the American Gas Association. Trammell Crow, owner and developer of the Trade Mart in which the Center is housed, welcomed visitors to the building.

In his address to the group, Norman noted that Dallas was a logical location for The Gas Appliance Center — because the Southwest is one of the fastest growing markets in the nation for gas appliances and equipment. He pointed out that Dallas is strategically located in the center of a five-state area of Texas, Oklahoma, Louisiana, New Mexico, and Kansas, in which are found 89.2 percent of the total natural gas reserves of the U. S. In Texas alone, he added, exist 45 percent of these reserves.

Located in the giant 1,000,000 sq ft Dallas Trade Mart, at the edge of the Dallas skyline, The Gas Appliance Center



North side of industry exhibit area houses offices for the Gas Appliance Center (left rear) and, at right, an automated, animated sight and sound display about natural gas, furnished by Lone Star Gas Company.



South side of industry exhibit area features a modern all-gas kitchen design (right rear) where products of exhibitors in the Gas Appliance Center are displayed on a rotating basis. Revolving display, left, tells "the gas story" at entrance.

contains an industry display area, a general exhibit area for small manufacturers, and individual showrooms for larger gas appliance and equipment manufacturers. Several manufacturers have located their regional or district offices in their showrooms in the Center.

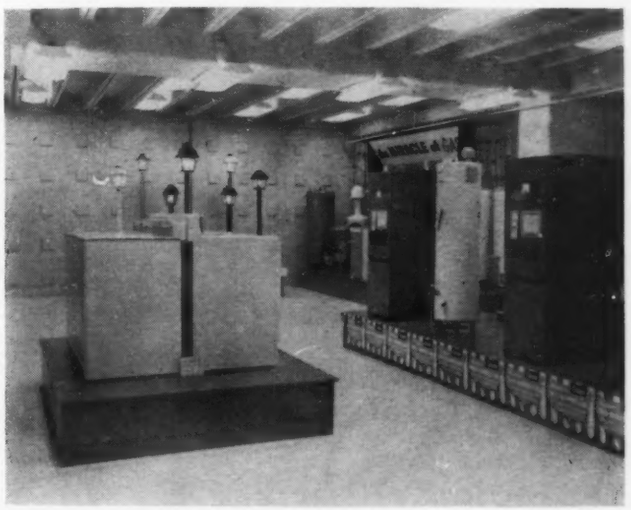
Thomas L. Fisher, manager of the center, will assist exhibitors and head a broad-scale, year-around promotional campaign designed to attract dealers, buyers, builders, designers, architects, developers, home economists, kitchen and remodeling specialists, and gas utility sales personnel to the Center. He will be assisted by Mrs. Loyce Campbell, secretary-hostess for the Center.

Among the companies that have leased space in the new Center are Arkla Air Conditioning Corporation; Bruest, Inc.; Bryant Manufacturing Division; Caloric Appliance Corporation; Coleman Products; Cribben & Sexton Company; Dearborn Stove Company; Dixie Products, Inc.; Hardwick Stove Company; Holly-General Company; Magic Chef; The Maytag Company; Norge Sales Corporation; O'Keefe & Merritt Company; Peerless Manufacturing Company; Philco Corporation; Geo. D. Roper Corporation; A. O. Smith Corporation; The Sunray Stove Company; The Tappan Company; Waste-King Company, and Whirlpool Corporation.

Officers and directors of the Gas Industry Exhibitors, Inc., all of Dallas, include David J. Kerr, president; J. B. Woods, vice president; Morris Hite, treasurer, and David A. Witts, secretary.

An advisory committee established to assist the Center includes Charles G. Barndt, Lone Star Gas Company, Dallas; Robert R. Suttle, Southern Gas Association, Dallas; Ray Cooper, American Gas Association, Dallas, and S. F. Wikstrom, American Gas Association, New York City.

Looking down corridor toward entrance. On either side can be seen display window fronts modernistic design of the various manufacturers' showrooms. Decor is simple, tasteful. Center is open year-around, has full-time manager and secretary-hostess.



Part of the 1500 sq ft general exhibit area is portrayed here. This area is reserved for small manufacturers. Larger showrooms range from 525 to 1375 sq ft, and several contain manufacturers' regional or district offices.

Prospect Program Helps Honolulu Gas Appliance Sales, Benefits Employees

R. N. Kumasaka, *Honolulu Gas Company, Ltd., Honolulu, Hawaii*

A NEW "PROSPECT PROGRAM" that gives employees a chance to augment their income and simultaneously contribute toward improving the utility's business has been developed by the sales department of Honolulu Gas Company.

To company employees, the incentive plan means cash bonuses for every prospect lead that results in a sale. To the utility, it means a vast new "sale force" to help spread the word about the miracles of modern gas appliances with the objective of increasing the use of gas throughout the Islands of the 50th state.

The program is open to all employees except company officers, department heads, and sales department personnel. Recognizing that personnel in many departments do not have regular contact with the public during a normal working day, the plan offers these employees greater compensation than for employees who normally work in contact with the public.

To minimize areas in which choices have to be made, the company organization is divided into two groups as follows:

. . . **Group A** consists of personnel not generally in public contact . . . and includes employees in accounting and clerical, plant, mains and service, purchasing, Isle Gas yard, and miscellaneous departments, and,

. . . **Group B**, consists of personnel who generally have some public contact . . . and includes employees in customer contact, file room, credit, service, installations, meter reading, and other miscellaneous departments.

A three-part form is used for the prospect slip. Employees submit white and yellow copies by special inter-office mail envelopes to the prospect clerk, who dates and time-stamps the slips and assigns the yellow copy to the salesman whose area is involved. The pink copy is retained in the employee's prospect slip book.

After making the first sales call on the prospect, the salesman writes his report on the yellow copy, which is returned to the employees as an acknowledgment. If the prospect has already been contacted by another salesman, the prospect slip is cancelled.

The prospect clerk files the white copy in a "Prospects Pending" file and attaches a prospect card with the yellow copy given the salesman. A notation is made by the clerk on the card, in red ink, showing the date and salesman's name. The card is used by the salesman for a record of all contacts made on the prospect. The white copy is automatically reviewed at the end of 90 days from the date shown on the time-stamp.

If the prospect results in the sale and installation of gas appliances, the employee receives compensation as follows — Group A, $4 for each approved new gas appliance; Group B, $2 for each approved new gas appliance. If no sale results in three months, the prospect is voided. General control of the prospect program and initiation of payment is handled by the prospect clerk.

Each day, all sales orders and all company work orders are screened against the active prospect file. If a prospect entry has been responsible for a gas appliance sale, the clerk requests by memorandum the appropriate compensation and notes the necessary order numbers.

On sales installed by plumbers or others without the company's knowledge, completion of requests for payment are somewhat slower. The procedure hinges upon receipt or a report from the salesman involved. In all cases, a final check is made by the salesman involved before any prospect is cancelled at the end of the 90-day period.

Appliances covered by the program must be new domestic A.G.A.-approved gas ranges, water heaters, refrigerators, incinerators, dryers, or washer-dryer combinations, connected to the company's mains for service.

Sales of appliances to other than the users, i.e., apartment or subdivision builders, government agencies, etc., do not count on the program. * * *

GAS EQUIPMENT PROSPECT

Address _____ ☐ Residence ☐ Apartment ☐ New Const. ☐ Commercial

Name _____

City _____ Telephone _____

Prospect now using _____ (Type of fuel) _____ (Type of Equipment)

☐ PRESENT USER ☐ IDLE SERVICE ☐ NEW SERVICE ☐ M/X#

IS PROSPECT FOR

☐ RANGE ☐ CLOTHES DRYER ☐ INCINERATOR ☐ BARBECUE

☐ WATER HEATER ☐ REFRIGERATOR ☐ LUAU TORCH ☐ (other) _____

Prospect discussed equipment ☐ YES ☐ NO Requested sales call ☐ YES NO ☐

I TALKED TO ☐ HUSBAND ☐ WIFE ☐ RELATIVE-FRIEND

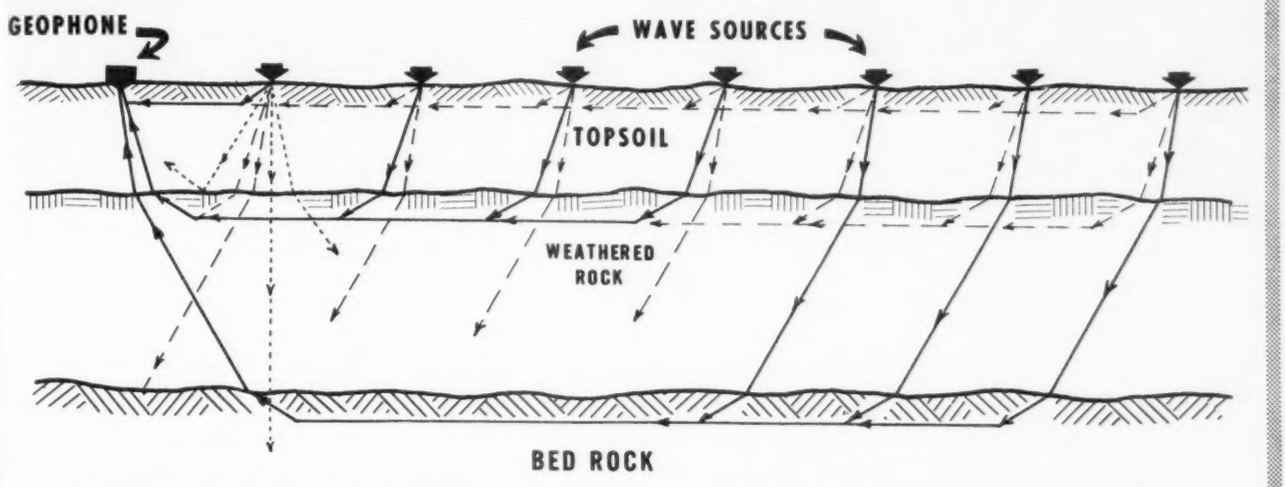
Contact When _____

Other Information _____

_____ (MY NAME) _____ (GROUP) _____ (DATE)

FOR SALES DEPARTMENT USE ONLY — GRADE — (DATE OF CALL) — (SALESMAN)

Prospect slip. Employees are furnished with books of this form to be prepared in triplicate. White and yellow copies are sent to prospect clerk, pink copy is retained by employee.



Operation of the seismic analysis equipment can be seen in the diagram. Seismic waves are created at the arrows, beginning at a point 10 ft from the geophone and moving out 10 ft at a time to 100 ft. At 10 ft, the wave near the surface is the first to reach the geophone. From 20 to 40 ft, the wave traveling through the denser weathered rock reaches the geophone before the waves traveling through the less dense topsoil or the deeper bed rock. Beyond 40 ft, the waves traveling through the bed rock are the first to reach the geophone. Although these waves travel farther, they move faster.

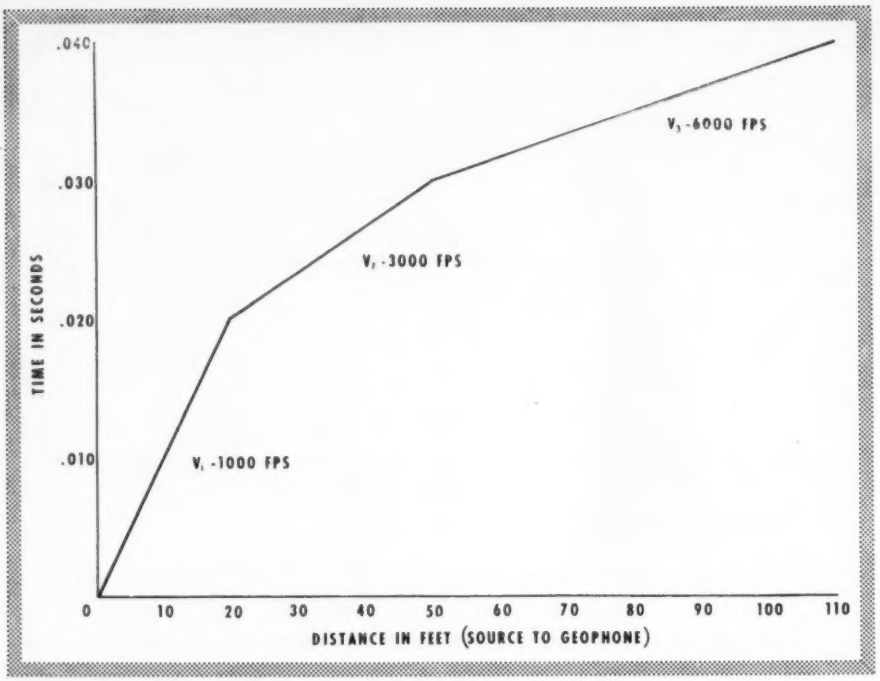
Seismic Analysis — New Technique For Solving Ditching Problems

ROCK, hidden under a deceptive mantle of soft earth, has provided many headaches for operators of trenching machines cutting ditch for construction of a new gas main . . . and finding it without extensive digging and testing has been a problem that has long plagued gas distribution construction men.

To the rescue comes a new seismic analysis technique, developed by Caterpillar Tractor Company, that offers a quick, easy, and inexpensive method of determining whether subsurface material can be cut by the trencher . . . or whether it must be ripped by a tractor-ripper unit or if it must be blasted. Either method is time-consuming and costly.

In the past, blasting and use of heavy-duty power shovels and backhoes provided the only solution to the problem. Today, powerful crawler

Subsurface analysis begins with the strike of the sledge against a steel plate on the ground. The shock wave travels underground to the geophone and on to the electronic counter. Distance can be measured from the plate to the geophone. Time is measured by the counter.



Time and distance are plotted on a graph, with distance in units of feet along the bottom and time in units of milliseconds along the side. Straight lines are drawn through adjacent points. Point X is the distance from zero feet to the point of intersection of the lines. Each material will have its own slope.

tractors equipped with rippers can shatter and loosen tough materials when necessary.

Ripping isn't considered a cure-all to every rock-handling problem encountered. Many other considerations must be weighed in determining the method to use for a particular case. Factors include type of equipment on the job or available, proximity of structures and populated areas, local regulations, costs, insurance rates, possible hazards, etc. Seismic analysis, however, can help show the way to finding the best method.

Prior to putting a trencher to work, the operator needs answers to numerous questions: Is there rock in the path of the wheel or ladder? Can the rock be ripped or must it be blasted? What equipment will be needed? How should it be used?

Key to whether rock—if found—can be ripped is **consolidation.** When all component particles of a material are attached, it is considered to be consolidated. Sand, for example, is unconsolidated, while sandstone is a consolidated material.

In examining other methods to determine if they could be adapted to the rock problem, engineers found that the *Los Angeles Rattler Test* for hardness—conducted on a sample of rock—looked good at first. But hardness alone does not determine rippability. Even granite can be ripped economically if it is fractured or weathered.

Core drilling tests are not very satisfactory, either, as core drilling provides tests of spots, not overall conditions, and the rattler test checks only rock samples, not consolidation.

Another method considered—electrical earth resistivity—has been used successfully by the Bureau of Public Roads and state highway engineers.

In this method, an electrical voltage is applied across an area to measure resistance of the earth. Good results are obtained in unconsolidated materials, but a typical state highway department believes it takes a trained geologist with a year's experience to accurately interpret the readings obtained.

Seismic Analysis Is Answer

A simpler method was needed—a method whereby the user could make accurate tests with only a few days' training. Seismic analysis offered these features. The refraction seismograph has been used extensively in mining and petroleum work. Lightweight, sturdy, and accurate, it can be operated with a minimum of training. The procedure was available and it was only necessary to interpret the results in terms of rippability.

Principles behind seismic analysis are simple. Sound or shock waves travel through varying subsurface materials at different speeds and along separate paths. Speed of a seismic wave depends upon the type and density—or consolidation—of the material. Path of the wave varies with speed and the thickness of the layers of the material through which it passes.

A wave source will create numerous waves. At short distances, the surface wave will be the first to reach the receiver, or geophone. As the distance from the source of the geophone increases, waves refracted through denser subsurface materials — traveling at a greater speed—will reach the geophone before the surface wave. Only the first wave received is recorded by the electric time counter.

With this time and distance data, two formulas and a graph provide information on the depth of the layers of different density materials and the speed of waves. Rippability can be determined by identification of the materials and relating the speeds of the waves to the materials.

Equipment Requirements

The equipment needed to make a seismic analysis is lightweight, simple to operate, and accurate. It includes a source of the sound or shock wave, a receiver, an electric counter, and a set of tables. It all weighs about 40 lb, and can be carried easily by two men. Field personnel can learn to operate the equipment in less than an hour, following directions furnished by the manufacturer. Working with the equipment for a day or two under known conditions will quickly develop reliable accuracy of operation.

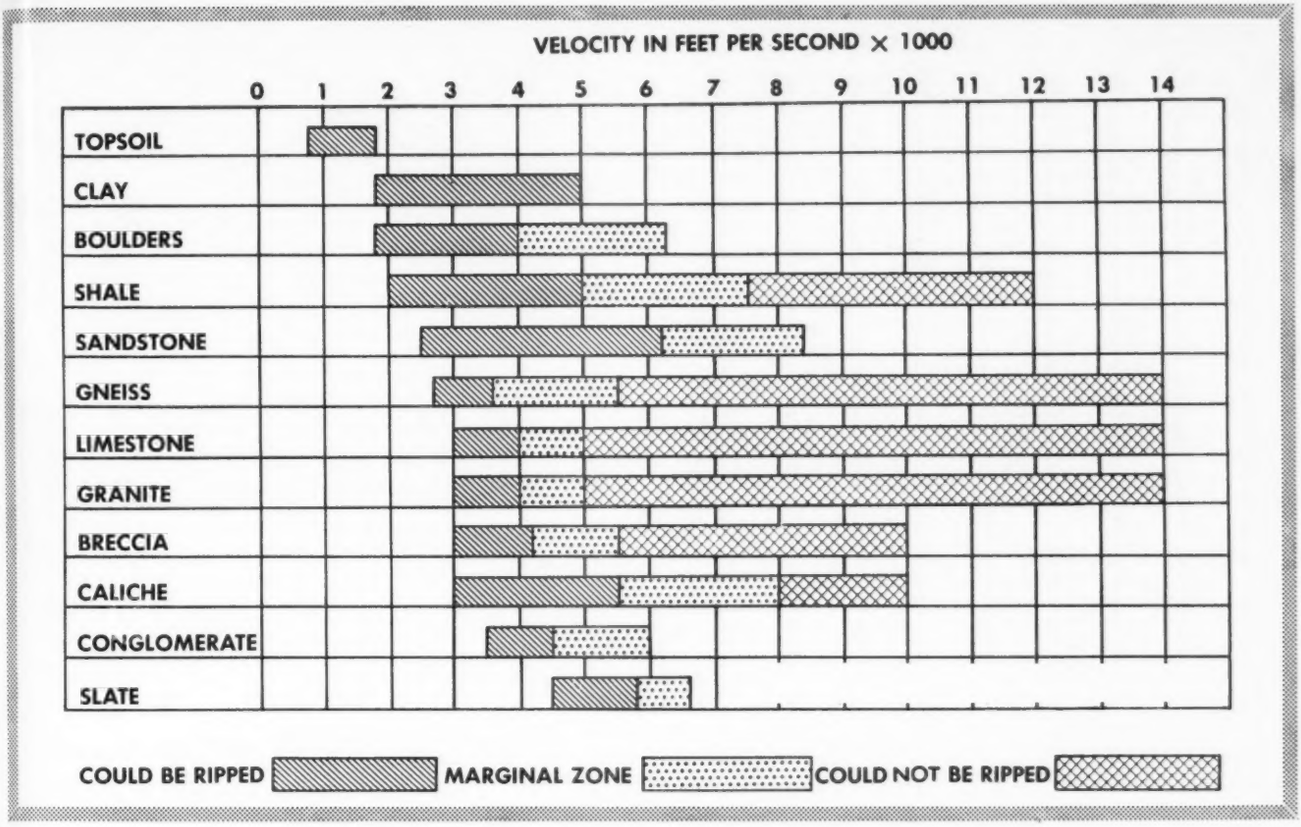
The sound or shock wave can be produced by several methods. In the oil fields, dynamite is customarily used, and can give readings down to more than 25,000 ft. Such depth is not needed to check a ditch route. In addition, even a small blast should not be used due to proximity of men, machines, residences, industries, etc.

For most purposes of study, an 8-lb sledge striking a 6-in. by 6-in. by 1-in. thick steel plate produces an adequately sharp wave that is strong enough to provide readings to depths of 50 ft.

The receiver is a standard geophone — a moving coil on a silicon fluid, resting on a base. A flat base geophone, which sets on top of the ground, is used if the surface is hard. A cone-shaped base can be pressed into the ground for better pickup in loose soils.

The electronic counter determines the time interval between the strike of the hammer and the arrival of the seismic wave at the geophone.

One model of the seismograph equipment, including self-contained batteries, sells for less than $3000. It includes the electronic counter, housed in a small metal container about the size of an overnight case, a geophone that plugs into one receptacle on the counter's face, and a long wire that plugs into another receptacle with the other end of the wire connected to a spring contact switch on the sledge.



Tables such as the one illustrated here have been compiled by Caterpillar engineers to determine if a subsurface material is rippable. A dozen common materials have been listed. Breakover point on wave velocity between rippable and non-rippable varies for each type. This table was developed for a large tractor with ripper.

Determining Rippability

Knowing the time of the wave travel and the distance from the hammer to the geophone, depth and wave velocity can be determined with two formulas. Tables of rippability based on wave velocities for a dozen of the more common materials have been established by Caterpillar after more than 500 tests were conducted throughout the country.

As wave velocities and rippability vary by consolidation, the tables can be used to learn whether a certain velocity through a certain material indicates it is rippable.

Operating the Equipment

In the field, a complete test can often be run in 10 to 30 minutes. The counter is set up and the geophone and contact switch lines plugged into the counter. The small steel plate is initially set up 5 ft from the geophone.

One man takes readings from the counter while the second man strikes the steel plate with the sledge. When the sledge hits the plate, the contact switch closes, starting the counter. Lights flash across the counter, marking the milliseconds fleeting by until the seismic wave reaches the geophone, stopping the counter. Steady lights indicate the elapsed time.

This time is noted on a data sheet opposite the distance from plate to geophone while the hammer man moves the plate to a new location, in line with the first location, but 10 ft away from the geophone. This process is repeated every 5 ft until the plate is 40 or 50 ft from the geophone.

In less than 10 minutes, the test can be completed and computations made. Velocity of the seismic waves is found by the formula:

$$V = \frac{D}{T}$$

Where D is the distance from the plate to the geophone and T is the elapsed time in milliseconds. This is plotted on a graph, with distance in feet along the bottom and time in milliseconds up the side. Points fall in line for each type of material as velocities are the same for similar consolidations. Intersection of straight lines through adjacent points indicates changes in consolidation.

Depth at which these changes occur is computed by the formula:

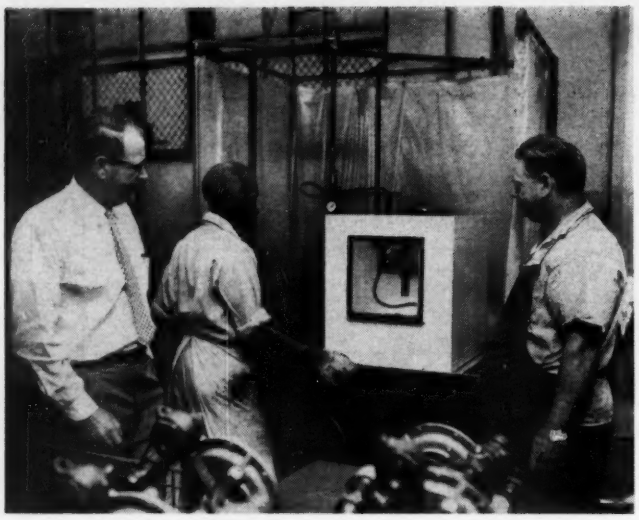
$$D = \frac{X}{2}\sqrt{\frac{V_2 - V_1}{V_2 + V_1}}$$

Where D is depth, X is the distance along the bottom of the graph from zero to the intersection point of the lines, V_1 is the velocity of the seismic wave in the upper layer, and V_2 is the velocity in the next lower layer. Depths of successive layers are determined in similar fashion.

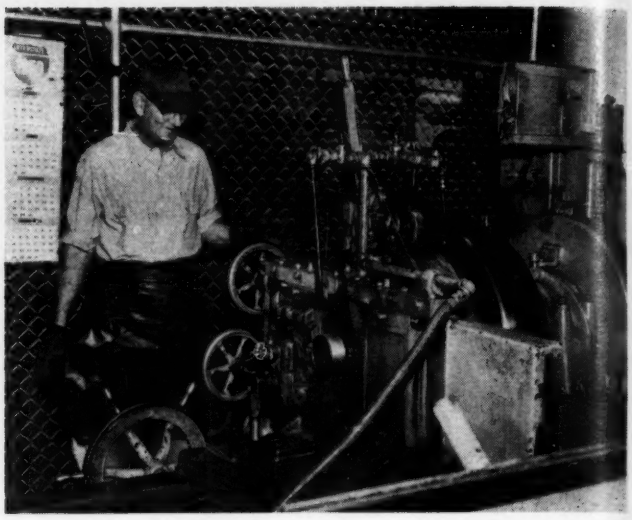
In the accompanying graph of a specific test made in the field, straight lines drawn through adjacent points indicate three types of materials present. Intersection of the lines indicates the changes in consolidation. By applying the second formula, it can be determined that the topsoil extended 3.5 ft deep, weathered rock lay below this material, resting on bed rock that was 10.7 ft below the surface. Velocity of the seismic wave through the rock indicated it was rippable.

In this case, the type of rock was determined by outcroppings; it can also be determined by core drillings or local knowledge. With this information, equipment needs can be better scheduled.

The method has certain limitations. Satisfactory results cannot be obtained when the surface is frozen, for the ground is then so consolidated that the surface wave almost always reaches the counter ahead of the subsurface wave, regardless of the density of the lower layers. Similarly, seismic analysis will not reveal the presence of softer materials below harder layers, such as in cap rock areas. * * *



Leslie Fleet, supervisor in Washington Gas Light Company's regulator and pipe shop, watches workman lower a meter connection and regulator unit into a water-filled tank for test under pressure of the complete assembly. The assembly, particularly the fittings, are carefully checked for leakage before the shop-fabricated unit is placed into storeroom stock. WGL designed and built the special testing tank.



Cutting and threading a section 4-in. pipe for use on special assembly for a dual regulator and meter installation. Machine handles pipe sizes of 2½ through 6-in. pipe.

Planning, Prefabrication, and Salvage In Key Shop Operation Helps Cut Costs

David Rains, *Washington Gas Light Company, Washington, D. C.*

PAPERWORK, TIME, WASTE, AND PIPE. Cutting all four of these is part of the job done every day by the regulator and pipe shop of Washington Gas Light Company.

The utility's service department construction trucks can carry pipe up to 9 ft in length . . . not any longer. But the company buys its small diameter pipe in single random lengths — approximately 21 ft long. After two 9-ft lengths are cut, what happens to the 3-ft "pup joint" that's left over?

The regulator and pipe shop puts it to good use. The short lengths are salvaged in the shop and used to make short pieces of pipe that go into regulator "build-ups," as well as for other storeroom stock kit items. As they say about coffee in Brazil, an awful lot of pipe is cut and threaded every year in the regulator and pipe shop.

Cutting and threading pipe, however, is not the shop's only operation. It also helps cut paperwork and time in field operations through the various prefabricated assemblies that it furnishes, it helps cut waste through an efficient salvage program, and it provides a maintenance program for regulators.

Every new regulator purchased by the company must go through the regulator shop for checking and testing against company standards before being put into service. From the field, a continuing flow of regulators that have been replaced comes into the shop every day and these are processed under a continuing maintenance program.

Each morning, a basketful of regulators removed from service is brought into the shop by a fork lift truck. After dismantling, they are cleaned, repaired as necessary, reassembled, painted, and made ready for service again. This operation comprises a major part of the shop's daily operations.

"Prefabs" Pay Off

Field personnel of the utility's distribution department benefit in time and paperwork savings from the operation of shop's pipe section. Instead of having to requisition item-by-item the materials needed for build-ups for regulator connections—and having to put them together in the field — they only need to submit a one-item requisition to the stores department. In return, they receive one of the various standard assemblies issued by the storeroom that contains everything needed for connection.

The prefabricated assemblies consist of most of the fittings, the regulator, and the meter connection for meter and regulator installations. These assemblies are normally placed inside the customers' premises. They are used on both residential and commercial installations.

Assembly, building, and testing of the "prefab" assemblies is accomplished in the shop, which obtains all necessary materials from the storeroom. All build-up units are made to meet standard specifications established by the company.

The shop personnel also make up special and large installations, such as multiple meter or dual meter and

For added gas loads... new concepts of flexibility, interchangeability, maintenance and economy.

This beautiful suburban home is equipped with gas appliances that are easy to live with and to maintain. ■ The original installation combined an AMERICAN® Welded Steelcase "W-175" Meter with a rated capacity of 175 cfh; a RELIANCE type "K" Regulator for inlet pressures to 125 psi, and outlet pressures from 3 to 14 inches w.c.; and a type "B" Filter. ■ The swimming pool was added and it was necessary to change the meter to a "W-300" with a rated capacity of 300 cfh. Meter setting is interchangeable, larger capacity meter is easy and simple to install, no piping changes required. ■ Note the complete flexibility and *custom appearance* of this *matched* equipment that goes together quickly, easily, with a minimum of on-the-job fitting. *Cuts costs* in shipping, handling, and setting. *A complete line with built-in longevity for all domestic services.* ■ *Write for bulletins containing complete specifications.*

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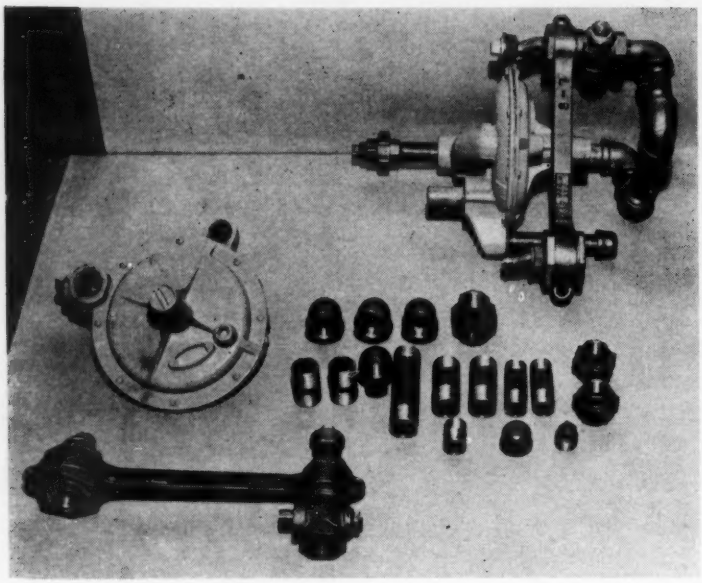


Loose parts for a 5-light horizontal meter and regulator assembly shown spread out beside a complete assembly. These parts are obtained either in a loose form "kit" or in a completed assembly by submitting a one-item stock requisition slip to the stores department.

Special assembly units are discussed by shopmen Frederick Starr and Horace Botts as they refer to blueprint specifications for an outside regulator installation of special design. Two complete assemblies are shown at left.

regulator, etc., sets that are normally installed by the service department's construction crews.

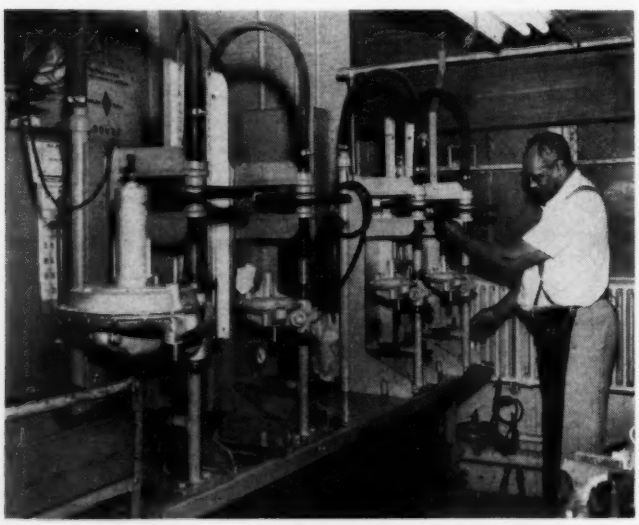
Additionally, the pipe section fabricates various special assemblies required in construction and operation of the distribution mains, such as small transmission main district regulator assemblies, concrete-pipe regulator vaults, etc. Prefabrication of the piping and equipment not only saves time, but also eliminates the necessity of having to do the job in the field where conditions might not be ideal.

Operations of the regulator and pipe shop are closely associated with the company's purchasing and stores department. The shop withdraws materials every day and much of what it assembles and constructs is returned to the storeroom for placement in stock. Because of this close relationship, the shop's operations were recently made a part of the purchasing and stores department.

Salvage Saves

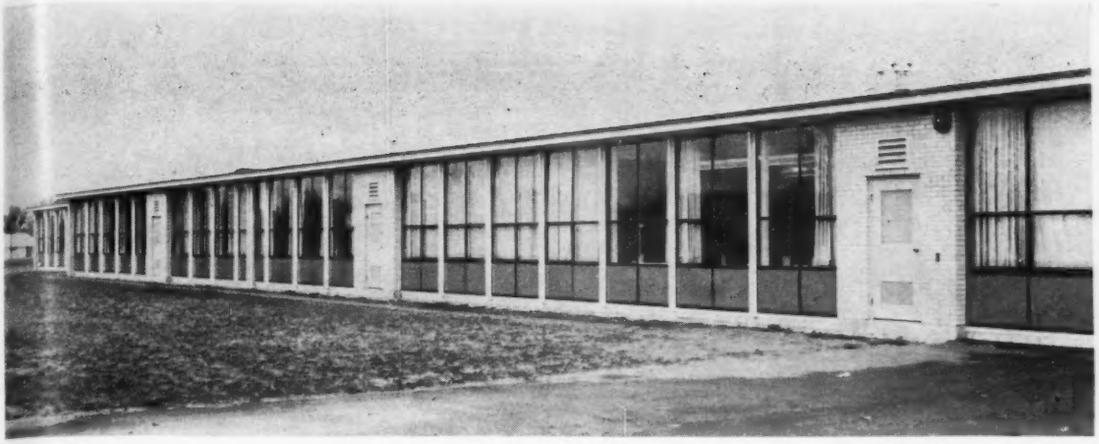
Salvage operations conducted by the regulator and pipe shop and by the storeroom save the utility many thousands of dollars each year. One of these operations, which is becoming increasingly important as the program expands, is concerned with materials left over after completion of company and contract jobs. Materials are now brought back to any of the company operating centers. Wire baskets are placed in easily accessible spots at each operating center. Contractors' and company personnel need only to place the leftover materials — which are unidentifiable job-wise and account-wise — in one of the baskets, which bear labels such as "meter and regulator assemblies," "miscellaneous," "valves," "scrap," etc.

As they are filled, the baskets are collected and brought to the storeroom or the regulator and pipe shop. Materials are then classified, cleaned, reconditioned if necessary, and either returned to stock or scrapped if not usable. * * *



At test bench, shopman William Moore puts a regulator through the paces, checking for leaks and pressure settings. Shop processes some 15,000 regulators each year.

Salvage operations promote return of usable, left-over materials from company and contract jobs. No paperwork is involved — just dropping items in baskets located conveniently at all plant sites is sufficient.



Outside doors at rear of new school lead to gas-fired heater units located between each two classrooms. Decentralized heating allows individual room temperature control, eliminates need for central boiler room to effect savings.

Berea, Ohio Cuts School Building Costs, Uses Modern Gas-Fired Equipment

GAS-FIRED EQUIPMENT, including a new "decentralized" gas heating system, is helping Berea, Ohio, to fight constantly rising school construction costs to a standstill. In fact, the Berea School District, engaged in a long-range program of new school construction, is finding ways of doing more for less money.

Berea's new Robert H. Lechner elementary school, for example, was put into use last September for the first time — and at a lower per-classroom cost than for any new Berea school built since 1953. Another new elementary school under construction and scheduled for completion by September 1960 will show an even greater cost-cutting.

How does Berea do it?

The answer is in the use of new ideas in utilitarian design and in the wide use of modern equipment, including many new gas-fueled items.

At the Lechner school, for example, architects designed an all-purpose room that can be used as a gymnasium, as an auditorium for stage presentations, or as a lunch room. The stage is placed along one wall of the all-purpose room. Along other walls, tables and benches fold flush and may be dropped into place for lunch room use. High, prefabricated window walls provide ample light for all uses — and when draperies are drawn over windows and a screen lowered, the room becomes a theater well suited for visual-education aids.

A chief economy feature — one that combines a departure in design with the use of ultra-modern equipment — is the use of a new **decentralized natural gas heating system.** This system eliminates the need for a central boiler room and the necessary expensive piping throughout the building. Despite the use of a number of small heating units, elimination of the boiler room resulted in a construction saving.

Decentralization is achieved by placing a gas-fired furnace between each two classrooms. The furnaces are located in small, separate heating rooms which are accessible from the outside. Thermostats in each classroom allow individual room control of temperature — and eliminate the traditional complaints that a room is either too hot or too cold.

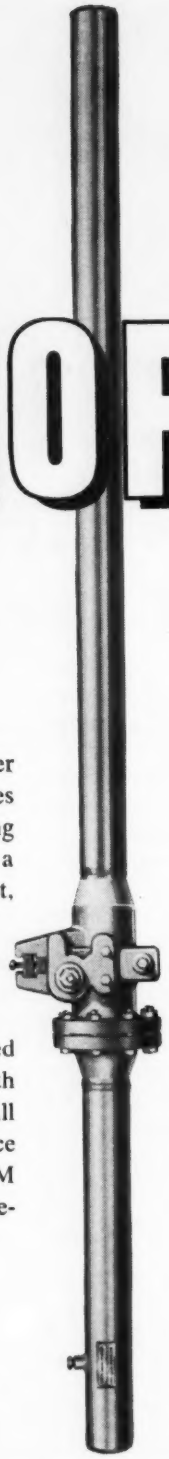
Each heater has filters for cleaning the air and uses outside air for combustion. Heater rooms can be added for additional class rooms without straining

H. C. Emmerich of Ohio Fuel Gas Company confers with fifth-grade teacher Mrs. Betty Breckenridge on use of thermostat in her classroom while her students study. Ohio Fuel, which supplies Berea with natural gas, provided advisory help for the school heating system as well as cooking, water heating, and incineration equipment.

Eight-burner gas range with two large ovens provides all cooking requirements in school kitchen, which also has automatic dishwasher and automatic gas water heater. Kitchen manager Mrs. Helen Gardner and school district dietitian Mrs. Emma Kregenow confer on school lunch menus over cup of coffee. With two part-time helpers, Mrs. Gardner feeds 100 students daily.

JUNIOR

flangnek meter tubes



The Daniel Junior flangnek meter tube provides operating advantages not found in simple, plate holding devices. The Junior fitting has a rack and pinion mechanism for fast, safe plate changing. Once the line is depressured a few turns of the speed wrench raises the plate clear of the fitting. Upstream tubes are factory-aligned with the fitting to form a smooth approach to the orifice plate. All specifications are in accordance with AGA, ASME, and ASTM standards. See your Daniel representative for all the facts.

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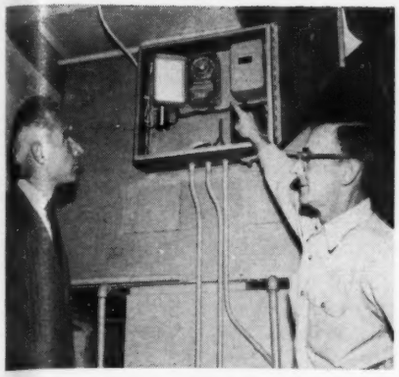


Master clock control that regulates all individual heater units in school is explained to principal William Seabrook by custodian Jack Reynolds. Although each room has its own thermostat, clock control lowers temperature at night, automatically raises temperature in early morning so building will be warm when classes begin.

the capacity of a single large heater unit and the heaters can be adapted for cooling if longer school terms are required.

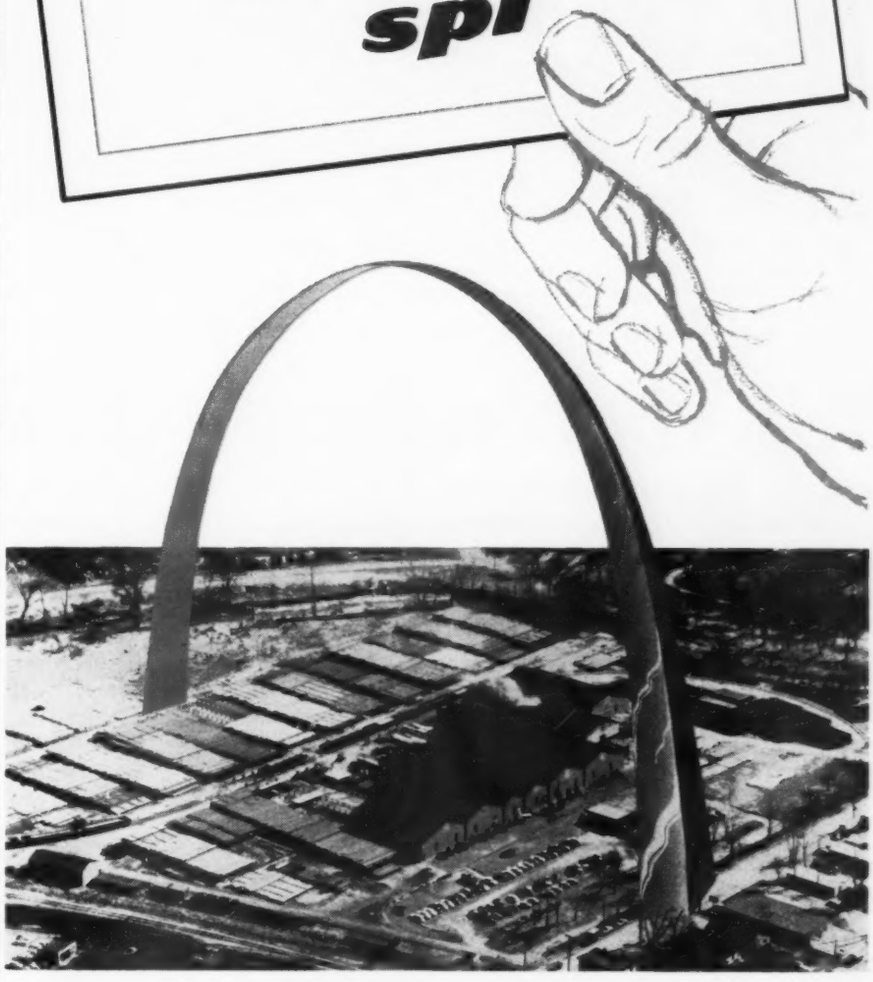
Predictions are that Berea's school population of 28,000 in 1959 will rise to 44,000 by 1965, so savings such as are demonstrated by elimination of the old school boiler room become highly important.

Lechner school was completed at a cost of $13.20 per sq ft — and the downward trend continues with a $12.85 per sq ft anticipated cost for the other elementary school now under construction.

The half-million dollar Lechner school was designed by Mellenbrook, Foley, and Scott, Berea architects. It has a capacity of 420 pupils, with 14 teaching stations, the all-purpose room, utility room, administrative offices, and kitchen. * * *

Huge automatic gas-fired incinerator is inspected by principal Seabrook and custodian Reynolds. It consumes all of school's waste material, including wet food wastes. Utility room also houses water heater and two heating units for halls and offices.

AN INVITATION TO LOOK UNDER THE ROOF AT spi



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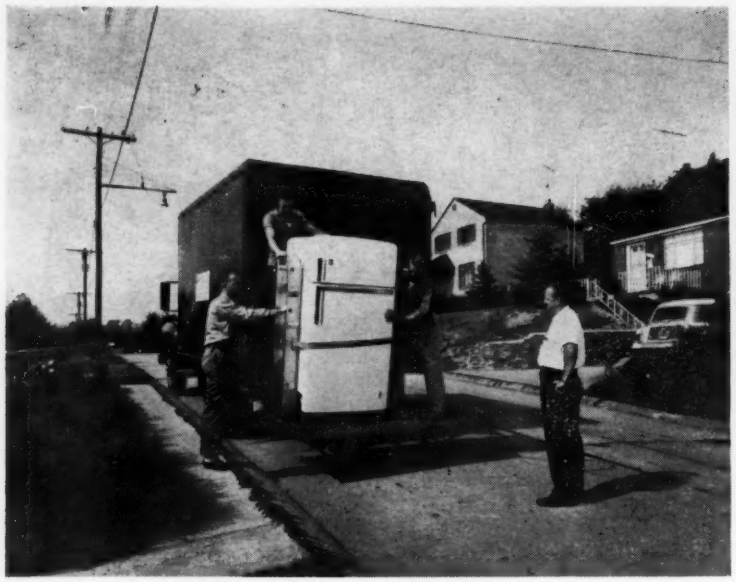
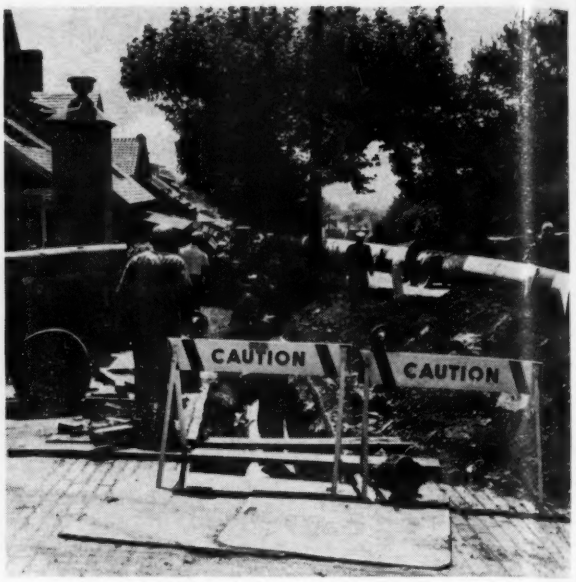


New gas refrigerator is readied for delivery into a customer's home by skilled crew of The Peoples Natural Gas Company of Pittsburgh, Pennsylvania. PNG customer service foreman Edward Hughes, right, watches as men from company's Forbes Shop — left to right, Leroy Rupert, Thomas Ritz, and Kenneth Rupert — unload the appliance.



Typical of big projects by Peoples Natural to improve gas supplies for metropolitan Pittsburgh is this project in the Wilkinsburg area, where 5350 ft of 24-in. pipe is installed to replace an existing 20-in. main. Line runs from Wilkinsburg Pressure Station to Swissvale Avenue.

DISTRIBUTION DEVELOPMENTS

NEWS ABOUT CURRENT AND PLANNED CONSTRUCTION

Superior Water, Light and Power Company, Superior, Wisconsin, has accelerated its program for conversion to natural gas and plans additional construction expenditures of approximately $1,200,000 by September, 1960, so that deliveries of natural gas from Northern Natural Gas Company of Omaha, Nebraska, might begin in October. Additional expenditures will be required, mainly, for the installation of an additional 56,750 ft of gas mains and for the conversion of a steam electric generating station at Superior, Wisconsin, to natural gas.

Saskatchewan Power Corporation, Regina, Saskatchewan, Canada, has completed new gas distribution systems in Yorkton, Bienfait, Moosomin, Melville, Melfort, Tisdale, Kinistino, Star City, Hoey, Dana, Cando, Yellow Grass, Milestone, Caron, Caronport, Rush Lake, Ernfold, and Birch Hills. The Yorkton project included 31.1 miles of 2 to 8-in. mains and services to serve approximately 1483 new customers.Contractor was H. B. Contracting Ltd. of Abbotsford, B. C. In Bienfait, approximately 10 miles of 2 to 4-in. mains were installed by contractor crews of Banister Helm Ltd. In Moosomin, 15.8 miles of 2, 4, and 6-in. mains were also installed by Banister Helm Ltd. In Melville, 7.77 miles of 2 through 8-in. mains and services a 4-in. transmission lateral into Melville, an 8-in. feeder main to the system and a town border station were installed by crews of Banister-Helm Ltd. Under the supervision of Fish Corporation Ltd., contractor crews completed the system conversion from butane-air to natural gas. Company crews converted all appliances in Melville. In Melfort, approximately 12.49 miles of 2 through 8-in. lines have been installed by crews of Robb Construction Ltd. Robb also installed systems in Tisdale, 9.64 miles of 2 to 6-in. to serve approximately 515 customers; 10.42 miles of 2 and 4-in. in Kinistino; 3.83 of 2-in. in Star City; 1.95 miles of 2 and 4-in. in Hoey; 9.28 of 2 and 4-in. in Dana; and 4.65 miles of 2-in. in Cando. Company crews installed 8.89 miles of 2 and 4-in. mains and services at Yellow Grass; 14.48 miles in Milestone; 3.22 in Caron; 2.72 in Caronport; 4.16 in Rush Lake; 3.69 in Ernfold and 5.82 miles in Birch Hills.

Wisconsin Public Service Corporation, Milwaukee, Wisconsin, will spend $1,771,000 for the new gas department construction by the end of year ending April 30, 1960. The record expansion expenditure covers additions and improvements to its natural gas system and consists chiefly of gas main extensions in newly-developed business and residential areas and the strengthening and replacement of existing gas systems. Vehicle and equipment replacement will total approximately $400,000 for the fiscal year.

Winnipeg & Central Gas Company, Winnipeg, Manitoba, Canada, completed installation of the last link in a city-girdling main distribution loop from which smaller distribution mains for particular areas are to be taken off. Project consisted of 41,000 ft of 12-in. main. Contractor was Mannix Co. Ltd. of Calgary.

Washington Natural Gas Company, Seattle, Washington, has construction underway on four large contracts to install more than 15 miles of main to serve over 40 large commercial accounts and approximately 1000 house heating customers at Ninelakes, a 634-acre development located about 9 miles north of Tacoma on Highway 99. Company has also completed a $5000 project to extend its mains to two new shopping centers on Highway 99 north of Seattle – Aurora Village located between north 200 and north 205 Street, and Richmond Square located between north 18th and north 182nd. WNG spent approximately $7,542,000 for construction to extend additional natural gas service to some 12,000 new customers in 1959, and is currently financing a $7,000,000 expansion program of natural gas service in the Puget Sound Area for 1960.

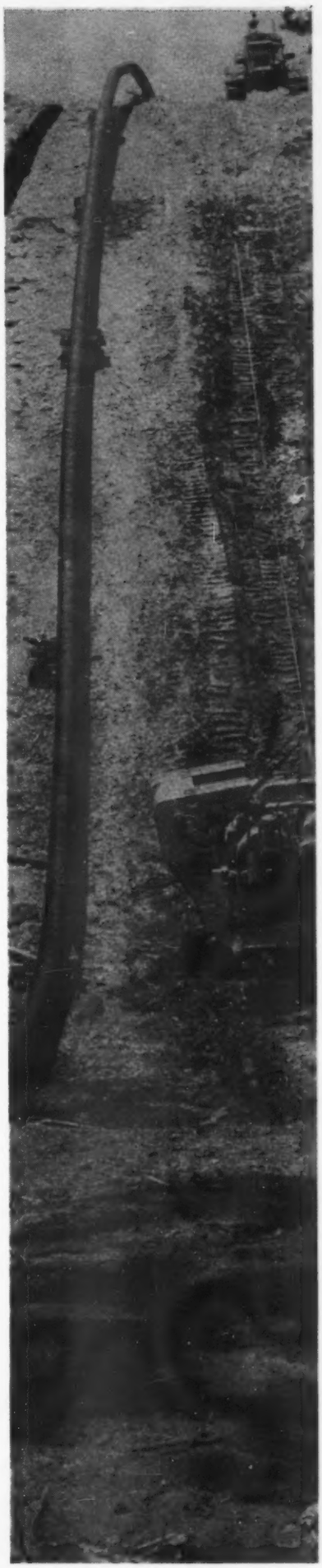
Oklahoma Natural Gas Company plans to odorize natural gas in every city and town it serves in Oklahoma and is currently purchasing land sites for installation of odorization equipment. Orders have also been placed for the odorizing equipment and the company is fabricating auxiliary piping and related equipment for the installations. Company's decision to use total odorization on its vast system resulted from demands of the Tulsa city commission for odorization of gas distributed in that city.

Arizona Public Service Company, Phoenix, Arizona, plans to spend $2.4 million during the first six months of 1960 for gas main extensions, new services, main replacements and other improvements. Included in this amount is further development of the company's recently inaugurated gas irrigation pumping program. Approximately $35,000,000 has been earmarked for gas facilities in the next five years — this will make Arizona's gas plant investment at the end of 1964 nearly twice their gas plant investment at the end of 1958.

Northern Indiana Public Service Gas Company, Hammond, Indiana, has completed 18 miles of 30-in. line through the Calumet area to connect with distribution lines of NIPSCO's northwestern interconnected system, now supplying 58 northern Indiana communities with natural gas. The project was divided into two major parts — a 12-mile section from the Indiana-Illinois line where NIPSCO receives Midwestern gas from Chicago District Pipeline Company's 36-in. line, to East Chicago, and a 6-mile section from Highland Junction to Gary. The projects included boring under 10 major roads and highways and under 19 railroad tracks, and trenching across the beds of 3 waterways, the Grand Calumet, and Little Calumet rivers, and Hart's Ditch. The 18 mile line required 3090 ft of 36-in. casing.

Northland Utilities, Ltd., Edmonton, Alberta, Canada, has completed installation of a natural gas distribution system in the town of High Prairie and Jasper, Alberta.

Iowa-Illinois Gas and Electric Company, Davenport, Iowa, recently completed a $1,260,000 project to make gas available to Campbell's Island, Green Rock, Silvis Heights, Carbon Cliff, Hampton, Colona, the Babcock and Meersman Addition and the areas along Colona Road and Friendship Road. The project included a 10-in. line crossing the Rock River in Illinois. The pipe was laid in a trench at a depth of about 3 feet beneath the river bed.



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ATLANTA 5, GEORGIA

Backhoe digs down to boost gas service in Chicagoland. Jack Duranto of Northern Illinois Gas Company's construction department, operates the backhoe while John Persha, crew leader, watches for the gas main. Later, service pipe will be tunneled under the sidewalk and installed along the drive to a new home.

Versatile unit shown here is a combination backhoe, front-end loader, air compressor, and mobile tractor, used for installing new services in residential areas by Washington Gas Light Company. Equipped with horn and lights, unit travels under own power from job to job.

Mountain Fuel Supply Company, Salt Lake City, Utah, has completed 24.4 miles of 20-in. loops on its main supply system in order to serve new customers. Line from Yellow Creek, Wyoming, to Coalville, Utah, was installed by Hood Construction Co. of Whittier, California. Company has added approximately 11,000 new customers during 1959.

Ohio Fuel Gas Company, Columbus, Ohio has construction underway on a $31,800 project to deliver gas to the National Gypsum Co. and improve gas service in the Lorain area. Project involves installation of approximately one mile of 6, 8, 10 and 12-in. line along Colorado Avenue between East River Road and Lake Breeze Road, and between Missouri Avenue and Kansas Avenue. Burkhardt Construction Co. of Barberton is contractor on the project. Construction is also underway on a $21,800 project to improve natural gas service in Salem by replacing a smaller diameter line with a half mile of new 10-in. line along Franklin Avenue from south of the Salem corporation limits to Summit Street. Wirt & Starn Inc. of Wooster is contractor on the project. A $61,500 pipeline replacement project to deliver more gas to Hilliard, northwest of Columbus, has been completed. More than 2 miles of 6 and 8-in. line has been installed north along the Rome-Hilliard Road from an existing O-F line at Roberts Road to an existing line at Scioto-Darby Creek Road. Don Miller, Inc. of Green Springs, Ohio, was contractor on the project. A $443,700 project including 5 miles of 20-in. pipe has been installed for O-F by Bernard Construction Company of Barberton. Construction has been completed by contractor crews of Ohio Pipeline Construction Co. on 3 separate projects totaling $23,600 to improve natural gas service in the community of Crooksville. Projects included installation of 1220 ft of 3-in., 490 ft of 2-in. and 1080 ft of 3-in. along Main Street, and 770 ft of 2-in. along Star Street.

Consumers Power Company, Jackson, Michigan, plans to connect 30,000 additional natural gas space heating customers in its Michigan service area as a result of an additional 100,000,000 cu ft per day allocated by FPC following abandonment authorization of Panhandle Eastern Pipeline Company's supply to Michigan Consolidated Gas Company. Consumers currently supplies 252,000 space heating customers in 29 Michigan counties; the 30,000 additional connections will be drawn from the company's current backlog of 170,000 applications for heating service.

90% cut in operating and maintenance cost means

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New, transistorized

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Rugged, transistorized construction practically eliminates maintenance costs . . . extends battery life to a year or more. Pinpoint accuracy, greatest depth penetration make the M-scope first choice in the field!

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SAFETY GAS MAIN STOPPER CO. INC.

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IH Bullgrader is raised, lowered, angled, and tilted hydraulically from the tractor seat.

Dig 10 feet deep with rugged, low-cost International Wagner No. 65-T backhoe. Digs anywhere in 180° arc.

Backfill, dig, load with low-cost, sturdy International Wagner No. 465 loader, capacity 3,500 lb.

Exclusive International Drott 4-in-1 combines ¾-cu yd bucket, bulldozer, carry-scraper, and clamshell.

Only the price is small!

The busy new International® T-340 helps you keep your work on schedule

Now you can have International crawler tractor traction, flotation, and dependability in a new economy size. It's the International T-340, scaled and equipped for a wide range of miscellaneous utility jobs.

Delivering 45 hp*, the husky, trigger-quick, four-cylinder engine gives you top operating economy in its power class. Optional Torque Amplifier drive gives you 10 speeds forward . . . plus a 45% pull-power boost in any gear *on-the-go*, at a touch of the TA lever. Or for shuttle-type jobs, choose Fast-Reverser which gives five speeds coming *and* going.

Unit-engineered equipment makes full use of the T-340's power, speeds, and ruggedness to get your work done fast and efficiently. Ask your IH dealer to demonstrate the "terrific" T-340 with the matched equipment to fit your kinds of jobs.

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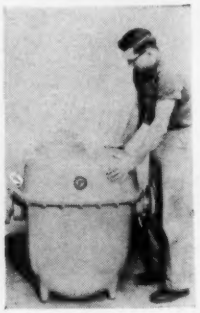
PRODUCT PARADE

MATERIALS – EQUIPMENT – SERVICES



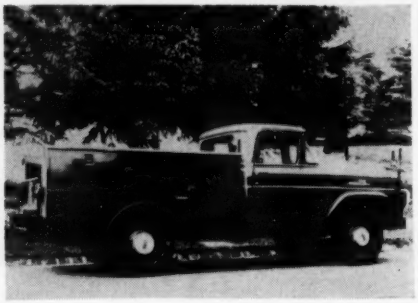
TWO LIGHTWEIGHT, large capacity, single joint aluminum gas meters — the No. "3000" and the No. "10,000" — have been introduced recently by Rockwell Manufacturing Co. New "3000" is rated at 3000 cfh and 1400 cfh at the 2-in. and ½-in. w. c. differential respectively; the "10,000" is rated at 10,000 cfh at the 2-in. and at 4700 cfh at the ½-in. w. c. differential. Because of the weight advantage and a rugged internal and external construction, both models are ideal for commercial and industrial operations where large volume loads at high pressure are needed. The "10,000" has a working pressure of 100 psi, yet weighs only 310 lb; the "3000" also has a 100 psi working pressure, and weighs only 100 lb. New "O" ring type gasket has been introduced on the two new models to insure a positive seal against leakage.

CIRCLE (1) ON THE REPLY CARD

ECONOMICAL TIME-SAVING SYSTEM for meter reading is described in new bulletin from Opti-matic Incorporated of Springfield, Illinois. By means of a new device the meter man can read the meter from the outside of the building everytime he visits. No need to make return trips and calls when he finds nobody home. Device is installed near a basement window where it can be viewed from the outside by the utility meter reader. An easily adjustable magnifier attached to the gas meter inside the house magnifies and reflects the reading to the Opti-matic.

CIRCLE (2) ON THE REPLY CARD

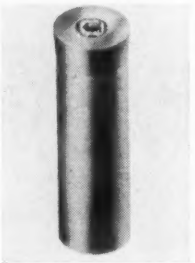
"JOB-PLANNED" UTILITY TRUCK BODIES designed specially for the gas distribution industry and manufactured by Reading Body Works, Inc., have been



developed with the cooperation of well-known trucking authorities. New units have structural reinforced features and radius corners at the top of each side compartment to both enhance the appearance of the truck body and give extra durability to the rub rail. In all 18 utility models, full width cross sills at critical stress points provide additional rigidity. Reading bodies range in size from a half-ton to one-ton.

CIRCLE (3) ON THE REPLY CARD

PAVEMENT INSERTS for Gas Leakage Survey. Central Plastic Distributing Co. has available permanent pavement inserts made of high-density polyethylene. Inserts are available in ¾ and 1¾-in. diameters by 6 in. long. This length is adequate for most street slabs. The ¾-in. insert has a ⅛-in. pipe plug in the top, and the 1¾-in. insert, a ½-in. socket head cadmium plated pipe plug. Once in place, these plugs can be removed to accommodate a leak detection probe. Insert is bright orange color to make location easy.



CIRCLE (4) ON THE REPLY CARD

The MINIATURIZED-PRECISION WILKINSON Line Locator Model W-3

This radically new, super-powered, transistorized instrument weighs only four pounds and is one-fourth the size of conventional pipe locators.

It is as handy as a flashlight; the maintenance is trivial; the non-leak miniature batteries last ten times longer. Long-life transistors eliminate replacement. Molded glass fibre cases. Transistor ear set. Telescopic aluminum handle. Etches circuitry and unique antenna. Contained in carrying case.

WILKINSON PRODUCTS COMPANY

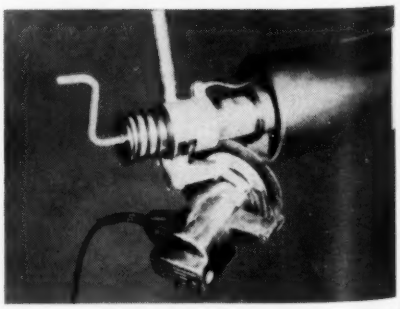
3987 Chevy Chase Drive • Pasadena 3, California • SYlvan 0-4314

FULLY TRANSISTORIZED ELECTRONIC COMPUTING SYSTEM for general purpose digital electronic computing has been announced by Royal Precision Corporation. New system, manufactured by General Precision, will be marketed by Royal McBee Corporation, joint owner of R-P. New "RPC 4000" is the first transistorized computer in its general price range to offer in one system complete flexibility for handling both business and engineering problems. Monthly rental includes the computer and tape typewriter system. No site preparation or installation costs are necessary. System is capable of operating on 9-digit numbers at rates up to 240,000 operations per minute.

CIRCLE (5) ON THE REPLY CARD

NEW INDUSTRIAL UTILITY TRACTOR, manufactured by Massey-Ferguson Industrial division, is a 54.5 hp unit designed to handle all types of industrial and construction jobs with a variety of power-matched attachments. Features dual range transmission with six speeds forward and two reverse, the Ferguson System with hydraulic draft control for 3-point attachments, and a 2-stage industrial clutch that permits operation of the Ferguson System and PTO when tractor is not in motion. Power steering is standard equipment.

CIRCLE (6) ON THE REPLY CARD

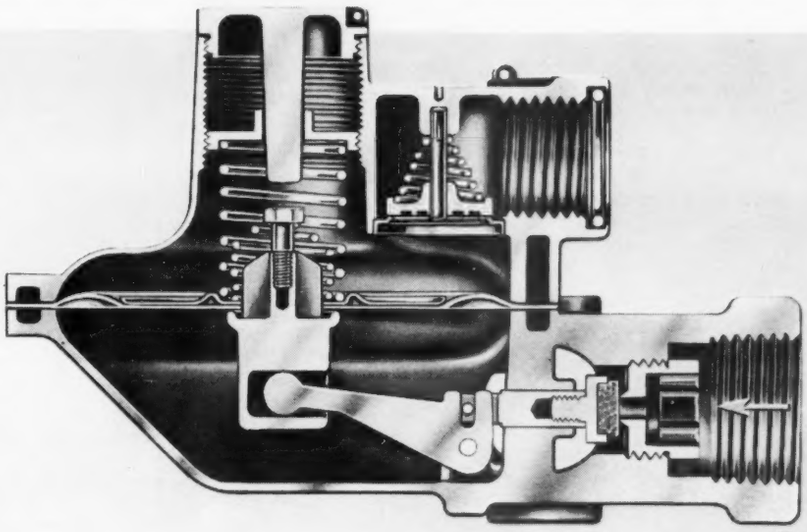


PIPE GRINDING MACHINE. Development of a patented electric motor driven grinding machine to smooth and put the lands on bevels automatically, has been announced by H&M Pipe Beveling Machine Co. Said to be the first automatic equipment ever developed for this work unit replaces method of using a file and hammer, or hand-grinder, to clean and land bevels. Available in two models — for 6 to 14-in. pipe and 14 to 36-in. pipe. Unit is lightweight and easily portable.

CIRCLE (7) ON THE REPLY CARD

The Leader Leads Again...

FISHER ANNOUNCES A NEW LOW COST SERVICE REGULATOR



SERIES

S250

HANDLES 99% OF ALL DOMESTIC INSTALLATIONS

Good news for the gas industry! Fisher now offers a new domestic service regulator designed especially for installations requiring 250 CFH regulating capacity or less. The new Series S250 is not only lower in cost due to the compact design, but it meets the requirements of 99% of all domestic installations.

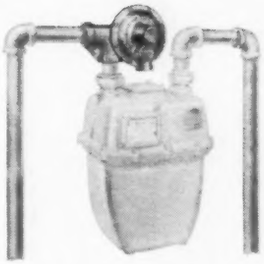
Capacity-wise, the Fisher S250 service regulator is the companion of the compact meters now available. This enables you to make a LOWER COST, COMPLETE customer service.

The Series S250 consists of Type S251 standard regulator with compact screened vent (no internal relief valve) and Type S252 with full capacity internal relief valve and large weather-proof vent.

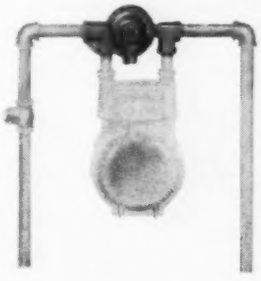
Aluminum body and lower casing are one piece construction. The "elbow" type body reduces your installation costs.

Design features body sizes ¾ and 1″ with orifice size ⅛, 3/16, ¼, ⅜″.

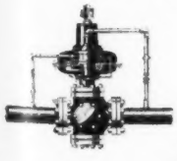
Capacity 250 CFH or more with or without full capacity internal relief. Suitable for upstream pressures up to 100 psi and springs available for reduced pressures from 3½″ W.C. to 15″ W.C.



The S250 meets the growing demand for a compact, low cost service regulator to match the small meters now being put into service. It simplifies installation problems and lowers installation costs.



The S250 regulator with integral meter bar provides the ultimate in low cost piping hook up.



IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD... CHANCES ARE IT'S CONTROLLED BY...

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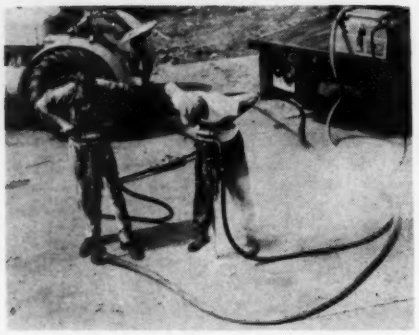
BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIPMENT CO., CORAOPOLIS, PENNSYLVANIA

FISHER® Control

SINCE 1880



DRY, DUSTLESS DRILLING SYSTEM available for all hand-held rock drills from Le Roi Division. Dust and cuttings are trapped by a collar that fits around the drill steel and are "inhaled" through a connecting hose to a dust collecting tank. In addition to eliminating dust as a health hazard, the newly-developed dust collecting system increases air tool operator comfort and efficiency, and promotes good public relations in residential and pedestrian areas.

CIRCLE (8) ON THE REPLY CARD

GAS-FIRED HEATERS, furnaces, and packaged blowers manufactured by Reznor Manufacturing Company are described in new 28-page general catalog. Unique illustrated 2-page Table of Contents enables reader to select heaters and furnaces according to type, applications, capacities, and major features. Complete specifications, dimensional and performance data is included for each category. Special sections discuss applications of each type heating unit.

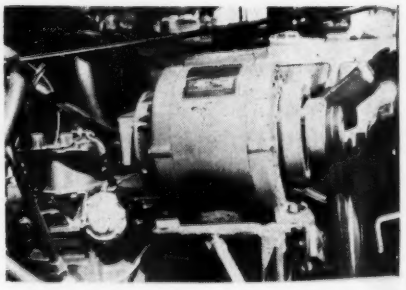
CIRCLE (9) ON THE REPLY CARD

WHITE TRUCK DIVISION of White Motor Co. has announced a new trucking development of interest to gas distribution companies — a city pickup and delivery truck equipped with a diesel instead of gasoline engine. A new 130 hp 6-cylinder diesel engine built especially for in-city operations is the powerplant of the new White 3016D tilt-cab truck. Engine develops 130 hp at 2500 rpm, and a peak torque of 295 lb per ft at 1800 rpm; it is used in combination with a synchronized 5-speed transmission and short wheelbase of only 97½ to 181½ in. Installation of the diesel engine beneath the power-tilt cab permits an extra short wheelbase. The result is a truck that handles easily in the city and yet has sufficient chassis length for maximum body requirements of various pickups and delivery operations.

CIRCLE (10) ON THE REPLY CARD

CYCOLAC "LL," a resin developed specifically for extruding rigid plastic pipe, is described in new bulletin from Marbon Chemical Division, Borg-Warner. Cycolac LL resin represents an improved type of ABS material. Outstanding properties include superior impact strength at normal and low temperatures, excellent long term burst strength.

CIRCLE (11) ON THE REPLY CARD



GENERAC SALES INC. has expanded its line of heavy duty 110-220 v a-c truck mounted generators with the addition of a new 5000 w, 220 v, 3-phase, 60 cycle a-c generator. Like others of the line, the new model is designed exclusively for truck or tractor mounting and operation. Unit may be driven directly from truck engine or from the truck transmission via a power take-off. Mounting kits are available for adapting new model to all popular makes of trucks. Unit is characterized by its outstanding performance when operating a-c induction motor loads up through 3 hp in size. Control panel, furnished with each generator, includes meter to indicate proper operating range of generator, field and clutch switch fuses, and a 110 v a-c outlet and engine throttle control.

CIRCLE (12) ON THE REPLY CARD

1. MAINTENANCE PROBLEMS

2. UNACCOUNTED-FOR GAS

3. DANGEROUS HAZARDS

eliminate them all!

FREE: *This booklet describing the causes of corrosion and how to prevent it can be yours by writing to us.*

Yes, all of these problems can be reduced, or **eliminated completely** with the proper application of a cathodic protection system using Standard Magnesium Anodes.

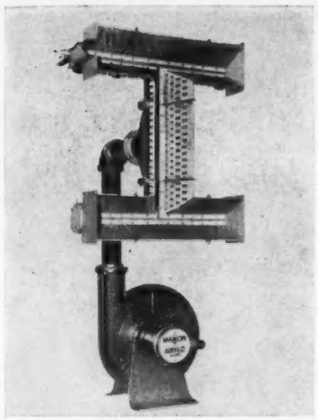
Standard Magnesium Anodes are designed to protect against **ALL** corrosion of your gas lines. For further information on how these anodes can help you prevent leakage contact:

QUALITY AND DEPENDABILITY THROUGH RESEARCH

Standard Magnesium Corporation
TULSA, OKLAHOMA

7503 East 41st Street • Tulsa, Oklahoma

MAGNESIUM INGOT • MAGNESIUM ANODES • MELTING FLUX



NEW GAS BURNER SYSTEM for industrial air heating applications recently introduced by Maxon Premix Burner Company provides temperature flexibility with its 25-to-1 throttling range; is based on principle of utilizing some oxygen from the stream of air being heated, and may be used on either re-circulating or single-flow systems. Line burner mounts directly in duct carrying hot stream of air to be heated, and the "Airflo" mixer unit delivering an air-gas mixture to the line burner is mounted outside the duct. Control of firing rate by means of a single lever makes automatic control simple.

CIRCLE (13) ON THE REPLY CARD

TRANE ABSORPTION COLD GENERATOR which uses low pressure steam as the energy source to produce chilled water for comfort air conditioning or process applications is described in new 3-color product catalog. Unit represents a major advance is absorption refrigeration equipment design as it is a single shell, compact, unit. It is the only completely hermetic, packaged absorption machine available. Water is utilized as the refrigerant and lithium bromide, as the absorbent. Catalog describes product features, unit's operational cycle in colored illustrations, the hermetic pump operation, purge design, and gives roughing-in dimensions and specifications.

CIRCLE (14) ON THE REPLY CARD

NEW SINGLE STICK CONTROL for crawler tractors developed by John Deere activates hydraulics to perform the various steps of clutching, braking, steering, and shifting for forward and reverse travel. New control, called "Pilot Touch," is offered as optional equipment on John Deere "440" industrial tractors. Located within easy reach of the operator's hand, the new control frees the other hand for full time control of loaders, bulldozers, and other working equipment.

CIRCLE (15) ON THE REPLY CARD

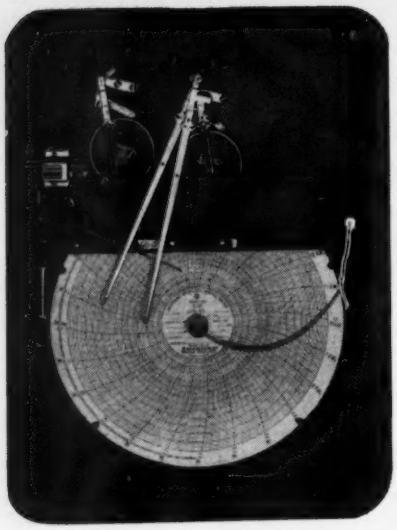
TRACTOLOADER, manufactured by Allis-Chalmers, is specially designed to speed and simplify excavating-loading jobs, backfilling, and stripping. Loader, which weighs 12,100 lb, has a breakout force of 13,200 lb; is ideally suited to dig out asphalt, concrete, and other hard-packed materials. Unit features power steering for fast easy maneuvering. Four-wheel drive provides stability and traction required for fast loading, even when operating under adverse ground conditions. Top travel speed is 20 mph in forward direction; 25 mph in reverse.

CIRCLE (16) ON THE REPLY CARD

GAS LIGHT KEY CHAIN GIVE-AWAY item helps dramatize the economy of gas lights. Miniature gas light is produced in clear plastic, with durable silk screen printing and features an actual orifice spud, which salesman can use to effectively demonstrate the minute gas usage of the gas light. Inexpensive and useful give-away is not only conversation piece, but an actual, graphic selling tool for salesmen.

CIRCLE (17) ON THE REPLY CARD

NEW Lancaster VALVE COVER
eliminates practically all troubles from normal sticking and lifting valves . . .
* Gum-resistant ring Specially compounded of friction-free inert carbon-graphite
New Lancaster Valve Cover has the most level and truly concentric seat surface ever achieved. Special compound of carbon-graphite is strong, shock resistant and silent . . . ends valve squeaks and is far less apt to break or chip in transit, repair or installation.
Large ½-inch stud is made of long wearing nickle-silver. It's rounded and swaged into the rugged brass shell . . . allows continual, positive contact with any driving dog position.
* Large-Profile Stud offers greater contact area
New, Improved Lancaster Carrier Wire Assembly
keeps pans moving in straight line . . .
Side carrier bracket height adjustment assures most accurate positioning . . . oval slots in new center bracket allow straight through diaphragm travel. Center bracket available separately adapts to any carrier wire. Porous bronze graphite bearings throughout.
"a meter is only as accurate as its parts"
Lancaster METER PARTS CO.
Manufacturers of Quality Parts for Gas Meters
POST OFFICE BOX 278 LANCASTER, OHIO



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INTEGRATING
ORIFICE
METERS

American Integrating Orifice Meters provide more accurate measurement by the continuous multiplication of the square root of the measured differential by the square root of the absolute line pressure.

Single, double and duplex-integrating models available in a wide range of manometer types and working pressures. Dust-proof, die-cast aluminum cases... Gasclok and electric instrument chart drives. Also supplied with American Telecounter for remote readings.

Ask for Bulletin 401 for complete details.

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METER COMPANY
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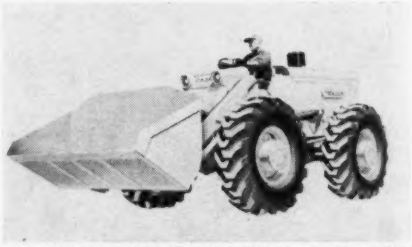
PRODUCT PARADE

HANDBOOK FOR ENGINEERS contains pertinent and detailed information on use of Kraloy PVC plastic pipe, fittings, and valves. Specification, design, and installation information is included as well as a comprehensive corrosion resistance comparison chart for 7 types of plastic pipe. Other charts show maximum operating pressures for PVC pipe and various temperatures, friction loss characteristics of water flow through PVC pipe, and flow of natural gas showing pressure drop in psi per 1000 ft of PVC pipe.

CIRCLE (18) ON THE REPLY CARD

INSTRUCTION KIT on how to successfully use the newly developed thermostatic top burner is available from Harper-Wyman Company of Chicago. Prepared for use by home economists, teachers, and students, kit includes a 4-page teachers' guide on how the burner works; a 24-page student guide entitled "Partners in Cooking"; and a cooking directory wall chart giving correct flame adjustment, time, and temperature for more than 150 foods. Kit available free of charge.

CIRCLE (19) ON THE REPLY CARD



NEWEST ADDITION TO J. I. CASE'S Terraload'r line is a 4-wheel drive, rear-wheel steer tractor-shovel that has a carrying capacity of 6500 lb. Standard bucket size is 2 cu yd; lift capacity is 13,000 lb. Optimum power-to-weight ratio minimizes wheel slippage and consequent tire wear, increases economy of operation. Wide tread and excellent weight distribution puts 40 percent more weight on the rear wheels; eliminates bucking or raising rear wheels off ground in "breakout." Unit is powered by 6 cylinder, 100 hp diesel engine built by Case.

CIRCLE (20) ON THE REPLY CARD

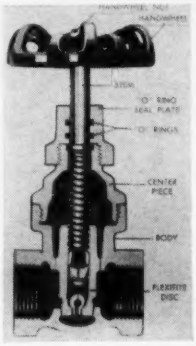
ELECTRIC GENERATING PLANTS. Onan's recently-added line of high capacity electric generating plants is described and illustrated in new 8-page 1960 general catalog. More than 45 basic models of Onan gasoline and diesel engine-driven generator sets are listed. Each series of plants is described in detail with specifications for both engine and generator to make it easier for the reader to select the proper type of generating plant for his particular needs. A chart of representative models within each specific series outlines capacity of the plant, model number, voltage, starting method, dimensions and weight.

CIRCLE (21) ON THE REPLY CARD

INSULATING COUPLING made of fiberglass reinforced epoxy is described in new bulletin from Ed Conley Plastics Corporation. The Conley Tulsa Couplings contain no metal yet have unusually high tensile and burst strength—150 psi operation can be maintained with a safety factor of over 10 to 1. Operating temperatures up to 300 F are feasible if non-shock pressures do not exceed 100 psi. Couplings stop electrolysis and corrosion where dissimilar metals, stray currents, soil conditions, and chemicals are contributing factors. Available in sizes from 1 to 4-in. diameter.

CIRCLE (22) ON THE REPLY CARD

MUSCO "O" RING BRASS GATE VALVE, manufactured by Modern Utility Supply Co. for general service on gas line where straight through flow is desired, uses two "O" rings in place of ordinary fiber asbestos packing. Top "O" ring serves as a dirt seat, the bottom "O" ring as a fluid seal. Use of a slotted flexitite disc whose slight flexibility automatically compensates for small misalignment of seat faces, assures a leaktight contact over the entire seating surface.



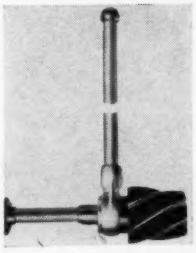
CIRCLE (23) ON THE REPLY CARD

SIMPLE METHOD OF TELEMETERING, monitoring, indicating and controlling is described in new bulletin from Femco, Inc. The Audio Tone Systems are especially advantageous where audio tones can be transmitted over leased telephone lines. Many frequencies may be transmitted over the same pair of wires by an oscillator for each tone. Filters at the receiving end pick out only the frequency signal for which each is designed. Combination systems—audio tone (a-c) for telemetering and d-c for indication and control — are possible by incorporating the Femco circuit scanner.

CIRCLE (24) ON THE REPLY CARD

J. F. PRITCHARD HYDRYERS, packaged dehydration units are described in new 4-page bulletin. Units use solid adsorbent; gas passes through the adsorber and exists at the required dew point. Drying cycle continues only until adsorbent becomes "saturated"; it is then reactivated. Adsorbent is heated to vaporize adsorbed moisture, then cooled to a predetermined temperature. Standard units operate on 8-hour and 4-hour cycles, but can be adapted to other cycle lengths. Standard units will handle gas flows up to 2000 scfm, saturation temperatures up to 120 F and pressures between 30 and 150 psig. Components are assembled into packaged units for shipment, only gas and utility connections are needed to start operation. Manual, semi-automatic, or full-automatic controls available.

CIRCLE (25) ON THE REPLY CARD



RIDGE TOOL COMPANY has recently introduced a new Ridgid hand reamer to smooth the inside edges of 3½ to 4-in. pipe. Ratchet handle speeds work in tight quarters; seven spiral cutting edges pare off metal with little effort and no chatter, and hand grip has a large pressure plate for comfortable application of body pressure. Hollow reamer reduces weight for easy handling and carrying.

CIRCLE (26) ON THE REPLY CARD

SUPERINTENDENT FOR NATURAL GAS UTILITY IN STATE OF OKLAHOMA

Responsiblity of all phases of engineering, distribution and transmission of a division consisting of approximately 15,000 meters under the supervision of the State Manager. Position has opportunities for advancement for the proper person. Salary is commensurate with qualifications. Please submit detailed resume of education and experience to Box 222, American Gas Journal, P.O. Box 1589, Dallas, Texas.